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Vol. 11 JANUARY 1960 No. 1

METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS

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METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS is a monthly publication devoted to:

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C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

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METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS

MALCOLM RIGBY, Editor

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SPECIAL FEATURE IN THIS ISSUE

Bibliography on Outstanding Reference Works of the Past Decade
By
Malcolm Rigby

(For table of contents see back cover)

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The *Bell* doth toll for him that *thinkes* it doth. . . . Who casts not up his *Eie* to the *Sunne* when it rises? but who takes off his *Eie* from a Comet when that breakes out? Who bends not his *eare* to any *bell*, which upon any occasion rings? but who can remove it from that *bell* which is passing a *peece of himselfe* out of this world? No man is an *Iland*, intire of it selfe; every man is a peece of the *Continent*, a part of the *maine*. If a *Clod* bee washed away by the *Sea*, *Europe* is the lesse, as well as if a *Promontorie* were, as well as if a *Mannor* of thy *friend's* or of *thine owne* were: any man's *death* diminishes *me*, because I am involved in *Mankinde*, and therefore never send to know for whom the *bell* tolls; it tolls for thee.

JOHN DONNE: **Devotions upon emergent occasions, No. 17,** London, **1624**

EDITORIAL

If it is true that all of humanity is a whole and that the loss of any fragment of humanity is a loss to every part; then it is equally true that all knowledge is a whole and if any bit of knowledge, research or organized data, regardless of source, language or field of knowledge, is lost through lack of diligence in abstracting and indexing or in dissemination of such indexes, then there is a corresponding loss to the entire world of knowledge.

This is why we have tried so diligently, during the past 10 years, to secure, catalog, abstract and index every bit of scientific literature related to meteorology, from every country and from every source. We have succeeded in obtaining about 90% of the world's literature in our field but have been able to index only about 75% of it, and in the last three or four years about half of the material abstracted has not been published.

A grant from the **National Science Foundation** which has just been received will enable us to publish and index about 6000 abstracts from our backlog of about 10,000 unpublished items. These will be issued during the coming year as 6 or more separate supplementary numbers with a supplementary index to the entire group; and the items contained therein will also be included in 10-year cumulative author, subject, place and journal indexes, also to be published under the National Science Foundation grant during the next year or two.

During the past three or four years the interests of meteorologists, oceanographers, hydrologists, glaciologists, seismologists, astrophysicists, radio propagation engineers and physicists, and scientists or technicians working in many other applied fields have become so interrelated owing to the universal IGY and Space Research projects, that it has become essential that our coverage be broadened to give more emphasis to those borderline and long neglected disciplines now coming to the forefront in urgent research projects relating to pure or applied meteorology.

Because of this broadened coverage, we have found it necessary to change the title of the publication to *Meteorological and Geoastrophysical Abstracts* to indicate the increasing emphasis on Geophysical and Astrophysical subjects. During the first three issues of 1960, only a few changes will be noted in the arrangement of material or in the emphasis on material from peripheral fields, because the manuscript was already arranged and indexed when the decision was made to change the title with the first issue of Vol. 11 (for obvious reasons) rather than in the middle of the volume. A considerable rearrangement of the material in Geophysics and Astrophysics will be noted in the April 1960 issue, however; and as the year progresses, more and more material in the peripheral areas will be included.

Items in fields relating to upper atmospheric physics, astrophysics and astronautics are being included through support provided by the **National Aeronautics and Space Administration,** and may be identified by a symbol Ⓢ after the pertinent abstract. Only a few appear in this issue, but by the end of the year (volume) at least 2,000 such abstracts will have been published in these categories.

Although it is discouraging to contemplate the swelling volume of worthwhile material that is not being abstracted and indexed, in spite of every possible effort to keep up or preferably to catch up with the world-wide production, there is some satisfaction in considering the number of books and articles which *have* been rescued from oblivion during the past 10 years. The figures to date are approximately as follows:

Number of abstracts published each year in Vol. 1–10 (1950–1959) of **MAB**

Vol.	Year	Abstracts	Vol.	Year	Abstracts
I	1950	3840	VI	1955	6294
II	1951	4499	VII	1956	5420
III	1952	5193	VIII	1957	5330
IV	1953	5706	IX	1958	4842
V	1954	5284	X	1959	5294

Vol. I–X, *total 51,702 abstracts.*

In addition, a total of about 32,000 titles of journal articles, translations, monographs and reviews have been listed in Part III of the monthly issues and indexed in the annual author indexes, making a grand total of over 80,000 works cited and nearly that many indexed (allowing for some duplication).

These works have come from about 100 countries and have appeared in at least 35 languages. Statistics on language and country of origin will be given as soon as the 6,000 items of backlog are published.

MALCOLM RIGBY

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DNLM:	U. S. National Library of Medicine, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts.
Ⓢ	after an abstract indicates an abstract prepared for NASA.

Geographic locations are in the English form rather than the form used locally, for example, Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet using a modification of the Library of Congress transliteration scheme.

FOREWORD

Meteorological and Geoastrophysical Abstracts is a monthly publication whose purpose is to bring to the attention of meteorologists, geophysicists and astrophysicists current literature in their field.

Part I contains abstracts of current literature in the fields of meteorology, etc.

Part II of each issue comprises an annotated bibliography of important references on a special subject (usually arranged chronologically).

Bibliographies published in the successive issues were:

Vol. I, 1950

1. Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
5. Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
9. Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

1. Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
5. Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm Detect.
9. Condensation Trails	10. Clim. of N. E. Africa	11. Mountain Met.	

Vol. III, 1952

1. Clim. of N. W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
5. Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
9. Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

1. Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc.
5. High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
9. Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V. 1954

1. Oceanog. Met.	2. Clim. of S. E. Asia	3. Auroral Physics	4. Tropopause
5. Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
9. Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

1. Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.		3. Storm Surges
4. Ionospheric Prop.	5. Photochem.—Upper Atmos.		6. Cloud Physics
7. Radar Cloud Physics	8–9. Atmos. Nuclei	10. Weather Modification	11. Cooling Power

Vol. VII, 1956

1. Synoptic Met.-Arctic	2. Clim. of Enclosed Spaces	3. Cosmic Rays (–1952)
4. Cosmic Rays (1953–56)	5. Atmos. Radioactivity	6. Inversions
7. Snow Micromet.	8. Snow Micromet. (Suppl.)	9–11. Tropical Cyclones

Vol. VIII, 1957

1. Solar Weather Relations	2. Night Airglow	3. Forecasting Special Elements
4. Forest Micrometeorology	5. Hydromet. Forecasting	6. Numerical Forecast. (Suppl.)
7. Albedo 8. Meteors	9–10. Tropospheric Prop.	11. Medical Meteorology

Vol. IX, 1958

1. Radioastronomy	2. Solar Astrophysics	3. Radioactivity in Atmosphere
4. Waves and Currents	5. Physical Oceanog.	6. Dynamic & Phys. Oceanog.
7. Long Range Forecast.	8. Radar Met. 9. Cosmic Rays	10–11. Geomagnetism

Vol. X, 1959

1. Works of C. E. P. Brooks	2. Tornado Forecasting	3. Soil Moisture	4. Sferics
5–6. Ozone	7. Acoustic Waves	8. Evaporation Measurement	
9. Evapotranspiration (–1955)	10. Evapotranspiration (1956–1959)		11. Evaporation

Other bibliographies in preparation are:

Atmospherics	*Ionospheric Physics*	*Rocket Meteorology*
Forecast Verification	*Ionospheric Propagation*	*Singularities*
High Atmosphere Temperatures	*Radiation*	*Synoptic Aerology*

Part III contains a listing of reviews, translations, reprints, and the contents of important publications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue comprises cumulative author, subject, geographical and journal indexes.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

See also: Bibliog. of **Reference Works of Past Decade,** p. 101.

11.1–1 551.5:551.46:92 551.513 551.509.312

†Bolin, Bert (*Univ. of Stockholm*), ed., **The atmosphere and the sea in motion: scientific contributions to the Rossby Memorial Volume.** N. Y., Rockefeller Institute Press, in association with Oxford Univ. Press, **1959.** 509 p. figs., tables, refs., eqs. throughout. Includes port. and 2 biographical sketches of Rossby. Publications by Carl-Gustaf Rossby, p. 60–64. (For listing of contents, *see* Pt. III, p. 148, Jan. 1960, *MAB.* These articles abstracted separately.) **DLC**—An elegant volume comprising 36 papers on scientific subjects on the general circulation, numerical weather forecasting, ocean currents and exchange between the sea and atmosphere, and 2 articles on Rossby's life and works plus a bibliography of his works, all written by colleagues or students who held him in great esteem. All of the articles except three are in English (one is in French and two in German). Some of the better known authors are: J. Bjerknes, B. Haurwitz, H. Stommel, W. H. Munk, H. Wexler, R. B. Montgomery, M. Neiburger, L. D. Kaplan, J. Charny, R. Fjørtoft, E. Palmen, O. Queney, J. Van Mieghem, J. Namias, A. Eliassen, F. Defant, H. Riehl, N. A. Phillips, J. Holmboe, R. R. Long, H. L. Kuo, G. P. Cressman, K. Hinkelmann, J. S. Malkus, P. D. Thompson, T. C. Yeh, C. L. Pekeris, and others. At the beginning is a translation of a long and thorough survey paper by Rossby on **Current problems in meteorology,** originally published by the Swedish National Science Research Council (in Swedish) in 1956. The papers were originally to have been prepared for a 60th anniversary volume, but Rossby died only a month after the invitations went out. Biographical sketches by Bergeron and Byers go into his early life in Sweden and into his fruitful career as an organizer in America, respectively. Editing of the volume was in the hands of Bolin, Charney, Eliassen, Platzman, and Stommel Most of the articles are highly theoretical, testifying to the influence this dynamic personality had on his many outstanding followers. *Subject Headings:* **1. Rossby, Memorial Volume 2. Biography of C.-G. Rossby 3. Ocean currents 4. General circulation 5. Numerical forecasting. I. Charney, Jule G. II. Eliassen, Arnt III. Platzman, George W. IV. Stommel, Henry.**—*M.R.*

11.1–2 551.507.362.2:629.19

Franklin Institute, Phila., **Ten steps into space: a series of lectures sponsored by the Franklin Institute, March–May, 1958, in Philadelphia.** Its *Journal . . . Monograph,* No. 6, Dec. **1958.** 202 p. figs., photos, tables, refs. Articles abstracted separately. **DWB** (629.1388 F832te). Review by Donald J. Hughes in *Science,* 130(379):857–858, Oct. 2, 1959.—Contents: Ley, Willy, **Long history of space travel,** p. 1–11. Stehling, Kurt, **The rocket and the reaction principle,** p. 12–28. Ritchey, H. W., **Rocket fuels—liquid and solid,** p. 29–50. Singer, Fred S., **Satellite instrumentation—results for the IGY,** p. 51–70. Herget, Paul, **Celestial mechanics: orbits of the satellites,** p. 71–88. Heller, Gerhard, **The Explorer; the Explorer story and the temperature control of the satellite package,** p. 89–113. Ehricke, Krafft A., **Error analysis of single and two-force field spacecraft orbits,** p. 114–149. King, J. I. F., **Probing the atmospheres of Venus and Mars,** p. 150–160. Simons, David G., **Space medicine: the human body in space,** p. 161–178. Levitt, I. M., **Satellites and travel in the future,** p. 179–202. *Subject Headings:* **1. Satellite observatories 2. Space flight.**

11.1–3 551.5:632.187(08)

Fire Weather Conference, Melbourne, Australia, July 2–4, 1958, **Proceedings.** Melbourne, **1958.** Each paper repaged (or has paging of original). 24 p. of introd. figs., tables, refs. Summary of the various sessions and text of 15 papers presented at the Conference. At head of cover-title: Commonwealth of Australia, Bureau of Meteorology. (For listing of papers, *see* Pt. III, p. 1605, Oct. 1959, *MAB*. These papers abstracted separately.) **DWB** (M:634.96 A938 pro)—The conference was held in the lecture theatre of the Royal Society of Victoria, Melbourne, from 2nd to 4th July, 1958 and was formally opened by L. J. DWYER, Director of Meteorology. The chairman of the conference was W. J. GIBBS, Assistant Director (Research and Development Division) of the Bureau of Meteorology. The proceedings were arranged in sessions, each session being related to one aspect of fire weather. Papers relating to current and recent fire weather investigations in Australia were prepared for the Conference. With the cooperation of the authors the papers were distributed some weeks beforehand. As a result, the authors limited their remarks to a brief discussion of the highlights of their papers and the greatest possible time was available for the general discussions which followed. *Subject Headings:* **1. Fire weather conferences 2. Fire Weather Conference, Melbourne, 1958. I. Dwyer, L. J. II. Gibbs, W. J.**

11.1–4 551.578.46(08)

Akademiia Nauk SSR. Institut Geografii, **Voprosy ispol'zovaniia snega i bor'ba so snezhnymi zanosami i lavinami.** [Questions of snow utilization and combatting snow drifts and avalanches.] Ed. by G. D. Rikhter. Moscow, Akademiia Nauk, **1956.** 182 p. figs., tables, refs., eqs. **DLC** (GB2401.A6). Section on snow retention for agricultural purposes summarized in *Polar Record*, 8(57):556–557, Sept. **1957. DLC**—This monograph contains 16 articles by various authors who have conducted engineering or scientific studies of the effects of snow cover on crops, control of snow cover so that it will be more evenly distributed and thus afford more protection against freezing and more durable moisture supply, snow melting processes, snow measurement techniques, snow measurement networks and their use in agrometeorological research, combatting snow drifts and avalanches, etc. on roads, railroads, etc., forecasting avalanches, mechanics of snow drifting and other related subjects. The articles are mainly of the engineering type with many statistical and illustrative figures and tables. The English summary in the **Polar Record** emphasizes the fact that snow cover insulates soil from low air temperatures and farmers should try to retain it against the wind. Two methods are recommended: planting rows of tall plants between rows of main crop, and snow ploughing. *Subject Headings:* **1. Snow retention studies 2. Avalanche protection 3. Moisture conservation 4. Snow drifting. I. Rikhter, G. D.** (*ed.*).—*M.R. and C.E.P.B.*

11.1–5 551.583.7(08)

†American Association for the Advancement of Science, **Climate and man in the Southwest: a symposium held before the 33rd Annual Meeting of the Southwestern and Rocky Mountain Div. of the American Association for the Advancement of Science, April 30, 1957, Tucson, Arizona.** *Arizona. Univ., Bulletin*, 28(4), Nov. **1957**; *Program in Geochronology, Contribution* No. 6, **1958.** 84 p. figs., photos, tables, bibliogs. throughout. Contents: Smiley, Terah L., **Years, centuries and millen[n]ia,** p. 11–18. Miller, John P., **Problems of the Pleistocene in Cordilleran North America, as related to reconstruction of environmental changes that affected early man,** p. 19–50. Harshbarger, John W., **Use of ground water in Arizona,** p. 51–68. Haury, Emil W., **Post-Pleistocene human occupation of the Southwest,** p. 69–75. Sears, Paul B., **Environment and culture in retrospect,** p. 77–84. **DWB** (M83.7 S641cL), **DLC** (GB124.S6A6 1957)—The problems discussed in this symposium report include: 1) In paper by SMILEY: C^{14} dating and the possible influences of glaciation, ocean levels, soil air and organic use of CO_2 on the ratios which are used to determine chronology, polynology or pollen analysis, paleontology, geochemistry, and geomorphology; 2) In paper by JOHN P. MILLER: extent of continental glaciation in the U. S. and in the Cordillera, and their correlation, changes in lake levels, streams, etc. not associated with glaciation, and absolute chronology of late Pleistocene events. It is concluded that there have been a number of continental and mountain glaciations in the U. S. and corresponding climatic changes, but just how many or how intense is still a matter of conjecture or at least of controversy. A good bibliography of pleistocene

glaciation in U. S. is appended. 3) JOHN HARSHBARGER discusses and illustrates recharge, discharge, storage and use of ground water and surface water by man, the current status of the water table, and data on its levels in Arizona. 4) Haury gives earliest valid date for human occupancy of Southwestern U. S. as 12,000 B.P., or just prior to the Mankato stage—possibly, 15–25 thousand B.P. but hardly >37,000, as some claim. Climatic changes during this time are discussed in connection with man's adjustment to his habitat after the glaciation when rainfall and vegetation were much greater, and during the climatic optimum when a serious shortage of moisture resulted from the higher temperatures about 5000 B.C. *Subject Headings:* **1. Climatic changes 2. Radiocarbon dating 3. Pleistocene glaciation 4. Ground water 5. Post-Pleistocene climate 6. Arizona 7. Southwestern United States. I. Smiley, Terah L.** *(ed.).—M.R.*

11.1–6 551.577.38:633(47,57)

*†Leningrad. Vsesoiuznyĭ Institut Rastenievodstva. Otdel Agrometeorologii, **Zasukhi v SSSR, ikh proiskhozhdenie, povtoriaemost' i vliianie na urozhaĭ.** [Drought in the U.S.S.R.: its origin, recurrence and effect on crops.] Ed. by A. E. Rudenko. Leningrad, Gidrometeorologicheskoe Izd-vo, **1958.** 206 p. figs., 7 tables, plus tables in supp., bibliogs. throughout. **DLC** (QC929.D8L4). Contents: Selianinov, G. T., **Proiskhozhdenie i dinamika zasukh,** [Origin and dynamics of droughts], p. 5–30. Alpat'ev, A. M. and Ivanova, V. H., **Kharakteristika i geograficheskoe rasprostranenie zasukh,** [Characteristics and geographical distribution of droughts], p. 31–45. Rudenko, A. I., **Tipy zasukh vegetatsionnogo perioda i ikh kharakteristika,** [Type of droughts during the vegetative period and their characteristics], p. 46–53. Bessonova, E. V., **Zasukha v razlichnye periody razvitiia sel'skokhoziaĭstvennykh rasteniĭ i ee vliianie na urozhaĭnost',** [Drought during various periods of the development of agricultural crops and its effect on crop yield], p. 54–70. Rudenko, A. I., **Vliianie zasukhi na urozhaĭ kartofelia,** [Drought effect on potato harvest], p. 71–93. Alpat'ev, A. M. and Trofimova, A. I., **Povtoriaemost' zasukh v raĭonakh osvoeniia tselinnykh i zalezhnykh zemel' Kazakhstana i Zapadnoĭ Sibiri,** [Recurrence of droughts in reclaimed and virgin areas of Kazakhstan and Western Siberia], p. 94–100. Shul'ts, G. E., **Dinamika fenologicheskikh protsessov na Evropeĭskoĭ territorii SSSR v zasushlivye gody,** [Dynamics of phenological processes in European Russia in drought years], p. 101–115. Maliugin, E. A.; Smirnov, V. A. and Shakhnovich, A. V., **Izmenenie mestnogo klimata sel'skokhoziaĭstvennykh poleĭ i ikh vlagooborota pod vliianiem orosheniia pri bor'be s zasukhoĭ,** [Change in the local climate of agricultural fields and their moisture exchange under the influence of irrigation during drought control], p. 116–134. Smirnov, V. A., **K voprosu vyiavleniia stepeni zasushlivosti territorii,** [Problem of the determination of the degree of dryness of a region], p. 135–144. Iakovlev, N. N., **Polezashchitnye lesnye polosy kak faktor izmeneniia transpiratsii sel'skokhoziaĭstvennykh rasteniĭ,** [Shelterbelts as a factor leading to a change in transpiration of agricultural crops], p. 145–161.—A series of 10 analytical articles on the causes, frequency, regional characteristics, types of drought, influence on various crops at different periods of development, phenological processes in drought years, local climatic changes caused by drought prevention measures, use of forest shelter belts to prevent drought, etc. The book is intended for hydrometeorological specialists, agronomists, scientific research workers at collective farms, etc. and practical workers, students and teachers everywhere in the U.S.S.R. A series of appended tables give data on droughts and crop conditions during years of severe drought (1885–1954), especially in 1921 and 1939, using meteorological data from 18 or more stations. Many statistical analyses of data are scattered through the text, giving a quantitative basis for the graphical (map) presentations of limits of drought. *Subject Headings:* **1. Drought, U.S.S.R. 2. Drought effects on crops 3. Phenological data during drought 4. U.S.S.R. I. Rudenko, A. E.** *(ed.).—M.R.*

11.1–7 551.507.362.1(08)

Symposium on High Altitude and Satellite Rockets, Cranfield, England, July 1957, **[Proceedings of] Symposium sponsored by the Royal Aeronautical Society, The British Interplanetary Society and the College of Aeronautics.** Pub. N. Y., Philosophical Library, **1959.** 136 p. figs., tables, refs., eqs. All articles abstracted separately. Contents: Massey, H. W. W., **Scientific applications of rockets and satellites,** p. 7–14. Rosen, Milton W., **The satellite launching vehicle,** p. 15–22. Stephens, W. H., **British upper atmosphere sounding**

Baxter, A. D., **Some propulsion problems of high altitude rockets,** p. 29–43. Bossart, K. J., **Design problems of large rockets,** p. 44–45. Petrov, Boris M., **U.S.S.R. rocket and earth satellite programme for the I.G.Y.,** p. 56–57. Hilton, W. F., **Recovery after re-entry, by the use of aerodynamic lift,** p. 58–71. Freeman, N. C., **Dynamics of a dissociating gas: non-equilibrium theory,** p. 72–81. Murray, P., **High temperature materials in relation to the satellite re-entry problem,** p. 82–88. Lines, A. W., **Some problems of instrumentation, telemetry and guidance,** p. 89–101. Clamann, Hans G., **Problems of respiratory metabolism in sealed cabins,** p. 102–106. Henry, J. P., **Psycho-physiological hazards of satellite flight,** p. 107–114. Shepherd, L. R., **Future developments in rocket propulsion beyond the atmosphere,** p. 114–128. **DWB** (629.1388 S989hi). *Subject Headings:* **1. Symposium on rockets 2. Rocket symposia.** Ⓢ.

11.1–8 551.506.5(99) 551.506.22(99)

*†Morskaia Antarkticheskaia Ekspeditsiia na Dizel'-Elektrokhode "Ob'," 1955–1956, **Opisanie ekspeditsii na dizel'-elektrokhode "Ob'," 1955–1956.** [Description of the expedition on board the Research Ship "Ob'," 1955–1956.] Ed. by Ivan P. Bardin. Moscow, Akademiia Nauk SSSR, **1958.** 237 p. 72 figs., 24 tables, bibliogs. throughout. English summary p. 236. **DWB** (M06.22 M886op), **DLC** (GC461.M6). Also its: **Aerologicheskie i meteorologicheskie issledovaniia, dizel'-elektrokhod "Ob'," 1955–1956.** [Aerological and meteorological studies, Research Ship "Ob'," 1955–1956.] Leningrad, Gidrometeoizdat, **1958.** 183 p. Almost entirely tables. **DWB** (M06.22 M886ae). Also its: **Gidrologicheskie gidrokhimicheskie, geologicheskie i biologicheskie issledovaniia, dizel'-elektrokhod "Ob'," 1955–1956.** [Hydrological, hydrochemical, geological and biological studies, Research Ship "Ob'," 1955–1956.] Leningrad, Gidrometeoizdat, **1958.** 218 p. figs., numerous tables. **DLC** (GC461.M6). Each vol. has added t-p. in English. At head of t-p.: Mezhdunarodnyĭ Geofizicheskiĭ God. Trudy Kompleksnoĭ Antarkticheskoĭ Ekspeditsii Akademii Nauk SSSR.— The preliminary oceanographic, actinometric, geological and meteorological results of the 33,000 mi first voyage (1955–56) of the "Ob'" to Mirny in the Antarctic, and back to Kaliningrad are set forth in detail in a dozen separate chapters of the first volume of the series, each written by one or more scientists. During the 16,000 mi cruise in Antarctic and Indian Ocean waters from Feb. 29 to June 8, 1956 (Mirny to Aden by way of New Zealand), 156 deep water oceanographic stations were occupied, and the physical oceanographic results (currents, waves, optics, ice, etc.) are presented in Ch. V (p. 48–90) by V. V. Shuleĭkin and other and the hydrochemical work in Ch. VI (p. 91–102). The main meteorological results are summarized in Ch. IV (p. 35–47) by L. G. Sobolev and R. F. Usmanov, including a well analyzed Southern Hemisphere synoptic chart for April 25, 1956, time cross sections, data on frequency of weather elements by latitude-longitude squares, frequency of winds aloft up to 20 km in January, March and May 1956 at Mirny, frequency of surface winds in coastal regions of Antarctica, etc. Methods of radiosonde, pilot balloon and surface observations are described, and frequency of observations on the "Ob'" are tabulated. The entire work contains a large number of graphs, cross sections, charts showing locations of "stations," tables of data with depth, etc. The final results will be in even greater detail. The volume on the aerological and meteorological observations gives *in extenso* the periodic (4 hourly) surface observations from Dec. 10, 1955 to June 26, 1956, including wave and sea ice observations as made on board the "Ob" enroute from Kaliningrad—the Antarctic (Jan. 5), Mirny (Feb. 29), Wellington (April 9), Adelaide (April 21), Davis Sea (May 13), Port Said (June 15) and Hamburg (June 26)—a total of 1219 meteorological observations plus the results of 182 radiosonde and 244 pilot balloon observations on the same expedition. In addition, a supplement (No. 1) gives the meteorological data for the Mirny Station for the period March 1–May 31, 1956 and for the "Lena" for Jan. 10–19, 1956 while on the oceanographic cruise from 39°S 12°E to 66.6°S 93°E. The "*extenso*" publication of oceanographic data obtained on the 150 stations occupied on the cruise of the "Ob'" from Feb. 29, 1956 to June 8, 1956 is presented in the third volume of the series. The hydrological and hydrochemical observations (p. 7–145) include a description of the methods and instruments used for deep water observations, the wave observations, the optical observations, the hydrochemical observations and the tabular data for the current measurements, visual wave observations, graphic wave observations and the hydro-optical observations as well as the hydrological and hydro-chemical observations. Maps and tables

show location of stations—Number 107 reached 4350 m depth. *Subject Headings:* **1. Oceanographic expeditionary data 2. "Ob'" Expedition, 1955–1956 3. Antarctic meteorological data 4. Antarctic radiosonde data 5. Soviet Antarctic IGY expeditions 6. Indian Ocean 7. Mirny, Antarctica 8. Antarctica. I. Bardin, Ivan Pavlovich** (*ed.*) **II. Akademiia Nauk SSSR.**—*M.R.*

TEXTBOOKS AND TECHNICAL BOOKS

See also: **Astronautics**, 11.1–110; **Air-borne contagion** (Wells), 11.1–133; bibliog of **Reference Works of Past Decade**, p. 101.

11.1–9 551.582.1(58) 551.311.12(58)

†Murzaev, Eduard Makarovich, **Sredniaia Aziia: fiziko-geograficheskiĭ ocherk.** [Central Asia: physico-geographical sketch.] Moscow, Gosud. Izdatvo Geograficheskoĭ Literatury, **1957.** 268 p. numerous figs. and photos, 4 maps (col. fold. in pocket), foot-refs., bibliog. p. 258–262. **DWB** (915.84 M984sr)—In this standard geographic outline the general climatic features of Central Asia (from the Caspian Sea to Western China) are discussed in one chapter (p. 111–129), and glaciation in another (p. 130–137). Water and runoff, which is scarce in this region, is the subject of the subsequent chapter (p. 138–170). The solar radiation received in different months, the temperature gradient as one goes higher in the mountains, and the potential evaporation are considered under the general discussion of climate. *Subject Headings:* **1. Climate of Central Asia 2. Hydrology, Central Asia 3. Glaciers, Central Asia 4. Central Asiatic U.S.S.R.**—*M.R.*

11.1–10 551.582.1(58) 551.583.3:551.324.63(58)

*§†Murzaev, Eduard Makarovich (*ed.*), **Sredniaia Aziia: fiziko-geograficheskaia kharakteristika.** [Central Asia: physico-geographical characteristics.] Moscow, Akademiia Nauk SSSR, **1958.** 647 p. 165 figs. (incl. numerous photos), 17 tables, bibliog. p. 611–624. Geographic index p. 625–631. 2 maps (col. fold. in pocket). **DWB**—This more comprehensive text on the geography of Soviet Central Asia, contains a chapter on **Climate** (p. 119–147) by K. V. Kuvshinova and L. A. Chubukov with a section (p. 143–147) on **Climatic changes in historical times** by the editor of the book. The following chapter (p. 148–166) covers **Glaciers and glaciation,** and the next (p. 167–210) takes up **Surface waters** (by A. O. Kemmerikh) and **Underground water** (by V. H. Kunin). The chapter on climatology takes up the annual monthly radiation regime on a perpendicular and a horizontal surface at Tashkent, the moisture balance of the region, effect of relief, peculiarities of climate in the winter and summer, respectively (with typical synoptic charts for many significant events); frequency of hot dry winds of varying degrees and temperatures and other analytical tables and illustrative graphs. A graph on p. 195 shows the secular variation in the level of the Aral Sea from 1850–1940 (lowest −259 cm, 1880; highest +50 to +70 cm, 1907–15, and 1935), and of the Caspian Sea (1550 to 1950) taken from B. D. Zaĭkov. Although changes are great and irregular in recent times, it is thought that no very marked changes have taken place in the climate of Central Asia in the past (L. S. Berg's theory) millennia, as the region is so far removed from the major ocean sources of heat and moisture, and the secular changes in height of the Himalayas, though significant in an absolute sense, are trivial in proportion to their actual height (10–15 m per century compared with 6000–7500 m) when the influence on rainfall or air masses is considered. Other authors say such is not the case. *Subject Headings:* **1. Climate of Central Asiatic U.S.S.R. 2. Climatic changes, Central Asia 3. Glaciers, Central Asia 4. Hydrology, Central Asia 5. Ground water, Central Asia 6. Central Asiatic U.S.S.R. 7. Aral Sea 8. Caspian Sea.**—*M.R.*

11.1–11 551.510.62:621.396.9(02) 551.501.81

†Battan, Louis J., **Radar meteorology.** Chic., Univ. of Chicago Press, **1959.** 161 p. tables, eqs., numerous figs. and foot-refs. On verso of t-p.: University of Chicago Committee on Publications in the Physical Sciences. **DLC** (QC973.5.B3), **DWB** (M01.81 B335ra). Review by M. A. Alaka in *World Meteorological Organization, WMO Bulletin,* 9(1):56–57, Jan. **1960.**—A well edited and illustrated textbook giving details of basic and recent knowledge

of radar, its applications to meteorology and to air navigation, intended especially for the nonradar meteorologist. Separate chapters are included on 1) principles of radar; 2) properties of electromagnetic waves; 3) propagation of em-waves (index of refraction, tropospheric refraction, effect of curvature of ray paths, anomalous refraction and meteorological conditions associated therewith); 4) radar detection of spherical particles (scattering, Mie and Rayleigh scattering, total scattering and absorption cross-sections); 5) scattering by melting spheres and nonspherical particles, polarization of energy; 6) attenuation by gases, hydrometeors, clouds, rain and snow; 7) use of radar for quantitative precipitation measurement; 8) distortion of echoes due to finite pulse length and beams widths; 9) application of radar in hydrology; 10) in cloud physics research (precipitation, hail, bright band, snow trails, generating lines, cloud seeding); 11) in mesometeorology (thunderstorm, squall lines, lightning, tornadoes); 12) airborne weather radar (for avoidance of turbulence, hail, icing and mountains); 13) in large scale systems, (hurricanes, precipitation patterns in cyclones and in convective systems); 14) angels; 15) instrumental techniques (isoecho contours, turbulence, Doppler radar, chaff wind measurements, polarization, polarization techniques and constant-altitude presentations of PPI echoes). Good author and subject indexes are provided. *Subject Headings:* **1. Radar meteorology textbooks 2. Tropospheric radio wave propagation 3. Weather radar.**—*M.R.*

11.1–12 551.510.62:621.396.9(02) 551.501.81

*†Hiser, Homer W. and Freseman, William L., **Radar meteorology.** 2nd ed. rev. by Hiser. Coral Gables, Florida, Marine Lab., Univ. of Miami, **1959.** 267 p. 102 figs., 11 tables, 139 refs., eqs. Price: $6.00 from Univ. of Miami. **DWB** (M01.81 H673 ra)—A fairly elaborate compilation of current information on radar meteorology, constituting a revision of the 1955 edition (first ed.) of a working text on meteorological applications of radar. The paper-covered monograph deals with: 1) the history of radar and radar meteorology; 2) characteristics of electromagnetic (reflected and pulsed) waves; 3) the pulsed radar system; 4) types of radarscope presentations (A-, R-, F-, P- and E-scope); 5) the radar equation; 6) surface and airborne radars; 7) weather radar characteristics; 8) radar propagation (reflection, anomalous propagation, refractive index weather effects, sea return, angels, etc.); 9) scattering and attenuation from rain, snow, ice, clouds, targets; 10) target distortions, effect of wind shear; 11) radarscope interpretations; 12) radar use in forecasting; 13) radar storm observation and 14) procedures for radar operation. Theory, schematic diagrams, nomograms and radar photographs are scattered profusely through the text. A fairly good list of references up to 1958 is appended. *Subject Headings:* **1. Radar meteorology textbooks 2. Tropospheric radio wave propagation 3. Weather radar.**—*M.R.*

11.1–13 550.3(02)

†Howell, Benjamin Franklin, Jr. (*Dept. Geophysics and Geochemistry, Penn. State Univ.*), **Introduction to geophysics.** N. Y., McGraw-Hill, **1959.** 399 p. numerous figs., tables, eqs., bibliog. p. 375–378. (*McGraw-Hill Series in the Geological Sciences*, ed. by Robert R. Shrock.) **DLC** (QE501.H73). Review by Bruce Abott in *Australian Journal of Science*, Sydney, 22(4):172–173, Oct. **1959.**—A thorough, technical textbook on geophysics as it relates to the solid earth, intended for an elementary or general college course in earth science. The origins of the universe, solar system, the earth and moon according to current theories, the age of the moon and earth, oceans as determined by various geochronological methods; the earth temperature, gradients of temperature, sources of heat; seismology, earthquakes, instruments, waves, data applications; mass, shape and size of earth; density, gravity, isostasy, tectonic forces, origin of continents, continental drift, tectonic patterns, geomagnetism, atmospheric and terrestrial electricity, geomagnetic and geoelectric instruments. The book is well illustrated and contains an excellent bibliography of work on geophysics and an author and subject index (combined). Although containing a great deal of material on solid earth geophysics, this work does not emphasize geophysical prospecting on other applied aspects of geophysics but rather the theory, observation, measurement, data and conclusions arrived at from these data. *Subject Headings:* **1. Geophysics textbooks 2. Seismology textbooks 3. Origin of earth 4. Geochronology 5. Tectonophysics 6. Geomagnetism 7. Geoelectricity 8. Geophysical instruments 9. Geodesy.**—*M.R.*

11.1–14 551.507.362(02)

†Newell, Homer E., Jr. et al. **Sounding rockets** [by] Homer E. Newell, Jr.; R. B. Cox; E. B. Dorling et al. N. Y., McGraw-Hill, **1959.** 334 p. numerous figs. (incl. photos) and tables, refs. at end of each ch., eqs. (*McGraw-Hill Series in Missile and Space Technology*). Price: $12.50. **DLC, DWB** (M07.362 N545so). Review by H. S. Bridges in *Review of Scientific Instruments*, N. Y., 30(12):1139–1140, Dec. **1959.** Review by Willis L. Webb in *American Meteorological Society, Bulletin*, 41(2):92, Feb. **1960.**—A well illustrated, high-quality book giving the latest information and data on most of the sounding rockets in use in the U. S., U.K., France and Japan, and including the following: history of rocket; use in geophysical and solar research, in military research; the Aerobee, Aerobee-Hi, Deacon and Cajun, ASP, Loki Wasp, balloon launched rockets, aircraft launched rockets, Nike-Cajun, Nike-Deacon, Terrapin, Viking, British sounding rocket—Skylark, French Veronique and Monica, Japanese Kappa and Sigma, future rockets, facilities for launching and, finally, artificial earth satellites—Vanguard. Russian rockets and satellites are not covered in this book. *Subject Headings:* **1. Sounding rockets 2. Satellite observatories 3. Military rockets. I. Van Allen, J. A. II. Singer, S. F. III. Townsend, J. W. IV. Masterson, J. E.**—*M.R.* Ⓢ.

11.1–15 551.509.3(02)

*†Watanabe, Tsugio, **Modern methods of meteorological analysis.** Tokyo, Gihodo Co., Dec. **1958.** 302 p. numerous figs. and tables, refs. at end of each ch. **DWB** (M W314ki)—A small but highly concentrated textbook full of information regarding recent developments and techniques in meteorological analysis and forecasting, starting with a chapter on literature sources (a page from *Meteorological Abstracts and Bibliography*, Vol. 8, No. 1, **1957** is reproduced photographically), in which the use of the U.D.C. in national and international bibliographies is emphasized, literature citations in Japanese journals are tabulated, etc. Statistical, graphical and numerical methods of analysis of data for climatology and forecasting are evident throughout the book. Citations to non-Japanese sources are more numerous than native citations. Analysis of various elements (rainfall, temperature, wind, turbulence, dynamic fields, diurnal and annual variations, mesoanalysis, synoptic morphology); modern methods, such as streamline trajectory, vorticity divergence and vertical motions; marine, local and macro-analysis; blocking action; waterspouts and cyclones in tropics and, finally, drought and agricultural meteorological analysis. Appended are the U.D.C. system for meteorology (551.5) and Japanese equivalents, and a list of journals and publications of the CMO and dates of publication thereof. *Subject Headings:* **1. Meteorology analysis textbooks 2. Meteorological Abstracts and Bibliography 3. U.D.C. for meteorology 4. Japanese language.**—*M.R.*

11.1–16 551.5(26)(02)

§*Shibata, Yoshitsugu, **Marine climate and weather charts.** Tokyo, Japan, Kaibundo Co., Feb. **1959.** 237 p. 143 figs., 3 charts, 28 tables, plates. In Japanese. **DWB** (M:551.46 S55ka)—A standard textbook in Japanese on the various elements of importance in marine meteorology: weather and climate, atmospheric conditions, monsoons, circulation, air masses, fronts, cyclones and anticyclones, typhoons, weather maps and forecasts, state of sea, instruments and equipment for marine observations and computations, ship weather stations. The bulk of the book is devoted to the latest techniques in synoptic (and upper air) analysis and forecasting of extra tropical and especially of tropical cyclones, streamline analysis, hurricane reconnaissance, etc. Many synoptic examples are given with analyzed color charts of the Far East included. *Subject Headings:* **1. Marine meteorology textbooks 2. Japanese language 3. Marine meteorology forecasting 4. Typhoon forecasting 5. Western Pacific.** —*M.R.*

11.1–17 551.510.535:551.510.62:621.396.8(02)

†Ratcliffe, J. A. (*Univ. of Cambridge*), **The magneto-ionic theory and its applications to the ionosphere.** London, Cambridge University Press, **1959.** 206 p. figs., tables, eqs., bibliog. p. 193–201. Price: 40 Sh. **DLC** (QC661.R33). Review in *Royal Meteorological Society, Quarterly Journal*, 85(365):320, July **1959.** Review by A. Scibor-Rylski in *Science Progress*, London, 47(188):776–777, Oct. **1959.** Review by G. H. Munro in *Australian Journal of Science*, Sydney, 22(4):176, Oct. **1959.**—Account of the theories of radio wave propagation

through the earth's ionosphere and through the ionized envelopes of radio stars, being concerned with the propagation of electromagnetic waves through a partially ionized gas in the presence of a magnetic field. The author is not content to follow a simple mathematical approach but searches for physical reasons for the behavior of the waves. Two approaches have been adopted: a macroscopic one in which the properties of the medium are averaged out and a microscopic one based on the motion of individual electrons. Ch. I treats the derivation of the equations, the microscopic approach, the physical reason for the characteristic waves and their dispersion, the absorption on the "macroscopic" theory and the microscopic picture of absorption. In Pt. II, the results are summarized in graphical form and simple rules demonstrated for computing curves of refractive index and absorption index as functions of electron density. Pt. III treats applications of the theory to the earth's ionosphere and mentions a wide range of phenomena capable of explanation in terms of the magneto-ionic theory of a homogeneous medium. Finally, the author discusses a number of relevant miscellaneous topics, including the relationship between the anisotropic behavior of the atmosphere and that of transparent crystals. A complete bibliography and an alphabetical index of subjects are included in this excellent work. *Subject Headings:* **1. Ionospheric propagation textbooks 2. Magneto-ionic theories 3. Radio wave propagation theories 4. Electromagnetic wave propagation.**—*A.V.* Ⓢ.

11.1–18 551.463:534(02)

†Officer, Charles B. (*Rice Inst. and Woods Hole Oceanog. Inst.*), **Introduction to the theory of sound transmission with application to the ocean.** N. Y., McGraw-Hill, **1958.** 284 p. numerous figs. and eqs., refs. at end of each ch. General bibliog. p. 279. (*McGraw-Hill Series in the Geological Sciences.*) **DLC** (QC233.04)—An advanced undergraduate text on the theory of sound waves and their transmission, especially through water. Velocity, temperature gradient, energy, intensity and density, pressure, particle displacement, units (decibels), finite waves, elastic waves, shock fronts, ray characteristics, refraction, boundary conditions, solution for shallow water, interference from surface mirror; deep water transmission, microseisms, seasonal variations in speed, explosive waves, reflectivity, 3-layer reflection, impedance, echo sounding, geophysical reflection and refraction profiles, attenuation, absorption are reviewed. Theory is illustrated by geometrical diagrams, cross sections or curves, as well as by hundreds of equations. *Subject Headings:* **1. Submarine acoustics 2. Acoustical propagation textbooks 3. Oceanographic acoustics.**—*M.R.*

MONOGRAPHS

See also: **Soviet Arctic exped.** (Gakkel'), 11.1–51; **Rainbow theories** (Boyer), 11.1–73; **Rainbow theories** (Crombie), 11.1–74; **Raingage comparison** (Poncelet), 11.1–163; **Forest areas of the world** (Paterson), 11.1–300.

11.1–19 551.582.2(966.1) 55:355

*†Stark, John T.; Paseur, James E. et al., **Military geology of Truk Island, Caroline Islands.** Prepared under the direction of the Chief of Engineers, U. S. Army and by the Intelligence Div., Office of the Engineer, Hdq. U. S. Army Pacific, with personnel of the U. S. Geological Survey, **1958.** 207 p. (incl. 16 figs., many fold.) 66 plates, 50 maps (fold. in pockets), 23 tables, 39 refs. Loose-leaf. **DWB** (559.66 U581mi)—In this mammoth compilation, several chapters are included which relate to climate and weather. The brief chapter on **Oceanography and special geophysical phenomena,** by Richard L. Hay (p. 41–42) gives cursory information on waves, surf, tidal waves and earthquakes. The chapter on **Water resources,** by Max H. Carson (p. 109–120) gives data by regions and also chloride content of groundwater samples (p. 119). Geological, soil, water resources and vegetation and engineering data maps are liberally included, as are many fine photographs. The chapter on **Climate** (p. 11–39, with 6 figs. and 10 tables), by David I. Blumenstock, gives a critical analysis of the available records for 5 stations on Truk, including tables and elaborate graphical presentations of wind (1919–38), rainfall (1904–56), temperature, etc. Most of the records are broken but conditions of pressure, temperature, humidity, cloud, visibility, sunshine, etc. are fairly constant from year to year. Only rainfall is extremely variable from place to place, hour to hour, day to day,

season to season and year to year, ranging from 100 to 200 inches per year. Intensity-duration frequencies are shown on a graph for return periods of 1, 2 and 3 years. Drought, thunderstorms, tropical storms, squalls, comfort climate and microclimates are also discussed. *Subject Headings:* **1. Military geology surveys 2. Climate of Truk 3. Water resources, Truk 4. Truk, Caroline Islands. I. Hay, Richard L. II. May, Harold G. III. Patterson, Elmer D. IV. Blumenstock, David I. V. Carson, Max H. VI. U. S. Army. Forces in the Far East.** —*M.R.*

11.1–20 57(26) 551.46

†Walford, Lionel A., **Living resources of the sea: opportunities for research and expansion: Conservation Foundation Study.** N. Y., Ronald Press, **1958.** 321 p. 23 figs., tables, bibliog. p. 297–307. **DLC** (GC57.W2) Price: 48 sh. Review by F. S. Russell in *Science Progress*, London, 47(185):178, Jan. **1959.** Review by J. L. McHugh in *Ecology*, Durham, N. C., 40(4):748–749, Oct. **1959.**—An excellent treatise devoted mainly to problems of marine biology. Ch. 2 deals with the geographical aspects, including a chart of the world's oceans, currents and areas where data have been collected by oceanographic institutions (plotted 5° quadrangles). In only a few regions (e.g., off the California and Washington State coast, off Japan and Kuriles and the Soviet Far East and in the North Sea, Black Sea, Adriatic Sea and Red Sea, the Norwegian Sea, Bay of Biscay, East coast of Australia and 2 other small spots in the Southern Hemisphere) have there been over 150 occasions on which data was collected in a 5° area. Many areas of the oceans (nearly half) have none. Other charts show percentage of time fishing is feasible in Feb., May, Aug. and Nov. in the vast areas of the oceans, taking into consideration the weather. Isolines range from 0 (Antarctic) to 90% and over for most of the tropical portions of the oceans. Ch. 5 deals with the environment which conditions oceanic resources, and our need for knowledge based on research, especially in the South Atlantic and Indian Ocean. Ch. 6 deals with the use of this knowledge of environment for developing fisheries. There are 240 marine laboratories in the world, 85% of which are north of 20°N latitude, and almost none in the Southern Hemisphere. Not only temperature, salinity, winds, radiation, and exchange of water masses (currents and upwelling), etc. but time of day plus season or year, plus nutrients, other biological forms which help or hinder a particular species and relief, constitute the environment. *Subject Headings:* **1. Marine biology research 2. Oceanographic research on environment 3. Marine ecology.**—*M.R.*

11.1–21 551.587(99)

†*Schumacher, Nils Jørgen, **Temperature, height and humidity, Maudheim, 71°03′S, 10°56′W.** *Norwegian-British-Swedish Antarctic Expedition, 1949–1952, Scientific Results*, Vol. 1, Pt. 1 (Aerology), A, pub. Oslo, **1958.** 94 p. 29 figs., 40 tables, 36 refs. **DWB** (919.9 N892s)—Daily (except for certain periods) radiosonde or rawinsonde observations made from March 15, 1950 to Jan. 10, 1952 (a total of 596 soundings with remarkably high percentage reaching the tropopause). Equipment for filling balloons, generating hydrogen, release of balloons, calibration of instruments, etc. is described; the peculiar difficulties encountered because of cold, snow and wind, and methods of overcoming these difficulties are related. Rates of ascent and height of bursting were studied for the 350, 500 and 700 g balloons for various seasons and thickness intervals. The corrections of the Väisälä instruments, lag coefficients and radiation errors are discussed and then the general and detailed features of the vertical temperature distribution, the annual or seasonal variations, height of tropopause, lapse rates, horizontal temperature gradients, comparison with Arctic stations and Little America, thicknesses and heights of standard layers or levels, extreme values of temperature and ranges, frequencies of temperature at standard pressure levels and frequency of thickness; mean temperature at different wind directions and frequency of thickness at different wind directions; interdiurnal variations of thickness and height, and humidity values. Tropospheric winter temperatures and stratospheric summer temperatures are lower over Antarctic than over Arctic. Thermal gradients were found to be directed toward the south at all levels at all seasons; this cooler air over the continent in both troposphere and stratosphere being peculiar to the Antarctic. Arnold Court's disappearance of tropopause in Antarctic was found to be a matter of definition—the tropopause being almost always present. The mean meridional temperature and thickness gradient over Antarctic is as great in summer as it is in the Arctic

in winter, due to high albedo over Antarctic in summer. The coldest winds are from the northeast and the warmest from the north and southwest—the former are warm due to advection of warm air and the latter due to subsidence or föhn effects. The cold northeast winds are due to ascending motion in old cyclones. Extremely low temperatures (−90° to −95°C) occur at great heights in winter but in summer the stratosphere is as warm as it is in the Arctic (−40°C). All told, this is a remarkably thorough and satisfactory analysis of a remarkable series of aerological observations made under extreme difficulties. *Subject Headings:* **1. Aerology of Antarctic 2. Upper air temperature data 3. Radiosonde release in Antarctic 4. Antarctic tropopause 5. Maudheim, Antarctica.**—*M.R.*

11.1–22 551.510.535:621.396:061.3

National Research Council. United States National Committee on International Scientific Radio Union (ISRU), **Report on the 12th General Assembly, Aug. 22–Sept. 5, 1957, Boulder, Colorado.** *National Research Council, Publication*, No. 581, **1958.** 195 p. figs. Mimeo. **DWB** (621.384 N277re), **DLC** (TK5700.I834). This report on General Assembly also issued in *Institute of Radio Engineers, Proceedings*, 46(7):1350–1383, July **1958.**—The 7 reports cover: 1) Radio measurements and standards by Ernst Weber; 2) Tropospheric propagation by John B. Smyth; 3) Ionospheric propagation by L. A. Manning; 4) Radio noise of terrestrial origin (sferics and whistlers) by Harold E. Dinger; 5) Radio astronomy by F. T. Haddock; 6) Radio waves and circuits by E. C. Jordan; 7) Radio electronics by W. G. Shepherd. Reports of Commissions 2, 3, 4 and 5 will be abstracted separately. The 12th General Assembly of U.R.S.I. at Boulder was attended by over 500 radio scientists from 26 countries. The reports provide an excellent summary of work going on all over the world in each field. The agenda for the 7 sessions is given on p. 1350–1 by Frederic H. Dickson, and U.R.S.I. and its officers and chairman are discussed on p. 1351–2 by H. W. Wells. The Address of welcome by Detlev W. Bronk, President of the National Academy of Sciences, appears on p. 1352–4. The extensive report to the Academy of Science contains notes on attendance, program, detailed transactions of the assembly, symposia and business sessions, documents, discussions, resolutions, etc. *Subject Headings:* **1. International Scientific Radio Union conferences 2. Ionospheric radio wave propagation 3. Radio astronomy.**—*M.R.*

11.1–23 551.509.314:519.24

†Lorenz, Edward N., **Prospects for statistical weather forecasting.** Mass. Institute of Technology. Dept. of Meteorology, Contract AF 19(604):1566 (Statistical Forecasting Project), Final Report, Jan. **1959.** 185 p. figs., tables, 53 refs. (on p. 28, 77, 142 and 183), numerous eqs. **DWB** (M09.3 M414s)—The principle is stated that in establishing any statistical formula, graph, or table for forecasting, the number of degrees of freedom allowed must be small compared to the number of independent observations of the predictand used, if the relationship is to succeed when applied to new data. To reduce the number of degrees of freedom by reducing the number of predictors, the Statistical Forecasting Project introduced the use of empirical orthogonal functions to represent a field of predictors. This procedure was successful in reducing the number of degrees of freedom, but it did not lead to better forecasts than those obtained by other procedures. The apparent inability of statistical forecasts to surpass a certain level of skill led to the notion of a plateau of predictability. The alternative hypotheses that the plateau does not really exist, that it exists but is not an intrinsic property of the weather itself, and that it is an intrinsic property of the weather all merit consideration. Nonlinear forecasting procedures seem to offer the best hope of surpassing the plateau. The nonlinear dynamic and synoptic phenomena of advection, displacement of systems, and steering suggest one particular nonlinear forecasting procedure. Schemes for the theoretical investigation of the predictability of weather may be based upon simplified forms of the dynamic equations. *Subject Heading:* **1. Statistical forecasting.**—*Author's abstract.*

11.1–24 551.509.33:551.326.8

*§Makarevich, T. N., **Metodika dolgosrochnogo prognoza zamerzaniia rek Severo-Zapada SSSR.** [Method of long-range forecasting of the freezing of rivers in northwestern U.S.S.R.] Ed. by O. A. Spengler. *Leningrad. Gosudarstvennyĭ Gidrologicheskiĭ Institut, Trudy*, No. 58(112), 1956. 75 p. 34 figs., 15 tables, 14 refs. **DWB**—Hydrological and meteorological

data for the rivers and basins of northwest Russia are used to form the basis of long range forecasts of the dates of freezing and closing of these rivers. In this extensive monograph the observational material, methods of compilation and use of data are first presented, then the relation of the autumn ice regime to the atmospheric circulation processes over the Eurasian Arctic and sub-Arctic are treated and, finally, the operational techniques for long range forecasting of closing of rivers by ice are described and illustrated. The detailed data are presented in tables and charts, statistical analyses, graphs, maps, etc. Many synoptic examples are included. Circulation indices are related to anomalies in dates of freezing, and basic data are presented *in extenso* in appendices. The outstanding feature of the ice regime of N.W. Russia is the variability in dates of freezing and in circulation characteristics, owing to the frequency of Arctic "cold waves," the counteracting influence of the warm air invasions from the North Atlantic and proximity to the Gulf Stream. A further factor is the large amount of water surface comprised in the lake-like rivers or river-like lakes of the region. Use of graphic pressure aids (based on September 500 mb pressures at "centers of action" over Greenland, Iceland and Siberia) gives a verification of 90%, and September Azores—Iceland surface pressure anomaly contrasts (circulation indices) give an 85% verification for freezing of rivers in N.W. Russia. For northern regions the 500 mb relationships prove most successful; for the southern regions, the circulation indices are most successful (90% for 1.5 to 2 months in advance). *Subject Headings:* **1. Long range river freezing forecasting 2. Ice forecasting for rivers 3. Circulation indexes 4. Northwest U.S.S.R. I. Spengler, O. A.** (*ed.*).—*M.R.*

11.1–25 551.586:628.8 551.524.36

Heating, Ventilating, Air Conditioning Guide, Vol. 37, 1959. Issued by American Society of Heating and Air-Conditioning Engineers, N. Y., **1959.** 768+476+48 p. figs., tables, refs., eqs. Price: $12 per copy. **DWB** (628.8 H441g), **DLC** (TH7201.H5)—This huge volume has a larger format than the previous editions (8½×11 in.), contains 286 new diagrams and charts, plus 5 new chapters: 1) high-temperature water systems, 2) the heat pump, 3) evaporative apparatus for heat rejection, 4) evaporative air cooling and humidification and 5) snow melting. Other chapters have been thoroughly revised to give data on outdoor winter design temperatures, data on heat transfer coefficients for ventilated attics, acoustical data, maximum allowable concentration of contaminants in enclosures, information on moisture transfer and condensation in cooled structures, etc. All told there are 57 chapters in 12 major sections: I. Basic principles, terminology, units, etc.; II. Environment and comfort (physiological); III. Heating and cooling loads; IV. Room heating and cooling techniques; VIII. Refrigeration, spray cooling and the heat pump, etc. There is an excellent subject index in the front and hundreds of useful tables, maps, nomograms, definitions, etc. The 476 p. Manufacturers Catalog Data section has a 24 p. subject index (4 colored pages) giving references to manufacturers of anemometers, hygrometers, acoustical instruments, temperature recorders, thermometers (distance, indicating and recording), etc. Many of these advertisers give detailed data on the equipment as well as photographs. *Subject Headings:* **1. Heating, Ventilating, Air Conditioning Guide 2. Degree-day data.**—*M.R.*

11.1–26 551.584.41 551.588.6:551.577.2:551.579.5(43)

*†Delfs, J.; Friedrich, W. et al., **Der Einfluss des Waldes und des Kahlschlages auf den Abflussvorgang, den Wasserhaushalt und den Bodenabtrag: Ergebnisse der ersten 5 Jahre der forstlich-hydrologischen Untersuchungen im Oberharz, 1948–1953.** [Influence of forest and cleared areas on runoff processes, water conservation and soil erosion: results of the first 5 years of forest-hydrological investigations in the Upper Harz, 1948–1953.] *Aus dem Walde* (issued by Saxony Landwirtschaft f. Ernährungswirtschaft), Hannover, No. 3, **1958.** 2 pieces (including supplement of tables), 223+104 p. 71 figs. (incl. photos), 40 tables+96 tables in supp. **English summary of results** p. 215–219. **DWB** (M:634.9 S273au). Reviews by H. Steinhäusser in *Wetter und Leben*, 10(8/10):150, **1958,** and in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, Vienna, 10(1):162–163, **1959.** Review by H. Schirmer in *Meteorologische Rundschau*, Berlin, 2(5):168, Sept./Oct. **1959.** Review by F. Sauberer in *Wetter und Leben*, 11(2/4):60, 1959.—Experiments were carried out from Nov. 1948 until Oct. 1953 in order to discover the effect of large clear cut areas on water yield and soil structure and to find ways to prevent damage. The experiments were planned by the late E. Wiede-

MANN. Precipitation and water runoff in the forest-covered Wintertal-valley, and the clear cut watershed of the Lange Bramke-creek in the Upper Harz Mountains, have been measured since 1948. This was done with a large number of rain gages and weirs with continuous water stage recorders. The observations were extended to include the forest-covered watersheds of the Steile Bramke-creek in 1950 and the Dicke Bramke-creek in 1951, as well as the Saukappe-spring in 1950 and the Steile Bramke-spring in 1951. Individual experiments were carried out to determine the surface runoff and erosion, the suspended load and bed load, and the interception and stem flow. Furthermore the temperature and the relative humidity were recorded. The volume containing the analysis and discussion covers the following aspects: 1) objectives, 2) history and organization, 3) geography, 4) geology, 5) forestry, 6) climate, 7) precipitation, 8) interception, 9) runoff, 10) springs, 11) erosion, 12) floods, 13) ground water, 14) water balance, 15) comparison with other similar projects, 16) summary. The volume of tabular data gives day to day data on air temperature, relative humidity, precipitation, snow cover, stream flow and water temperature, for the above mentioned areas. The results of the experiments are compared with the most important results of other experiments. (Pertinent articles will be abstracted separately.) *Subject Headings:* **1. Forest climatology 2. Forest influences on precipitation and runoff 3. Surface runoff and erosion 4. Soil moisture 5. Upper Harz Mountains, Germany.**—*A.V. & M.R.*

11.1–27 551.577.37(773)

†*Huff, F. A. and Neill, J. C., **Frequency relations for storm rainfall in Illinois.** *Illinois. State Water Survey, Bulletin*, No. 46, **1959.** 65 p. 14 figs., 36 tables, 14 refs., 21 eqs. **DWB, DLC** –A detailed analysis of heavy precipitation frequencies in Illinois, using annual and seasonal maximum precipitation data for 39 stations (1916–55), and daily amounts for cooperative stations. Periods of 1 to 10 days were evaluated for each of 4 general regions (N.W., N. Central, S. Central and S.E.). Charts show 50-year recurrence of 1-day precipitation, using (1) relation between annual and storm precipitation; (2) Frechet's method and distribution index, (3) Frechet's method without smoothing and (4) Gumbel's method (also showing forty-year patterns), respectively. Theory and methods are elaborated, coefficients of variation and skewness coefficients shown in chart. Data are presented in a systematic fashion for each season, each section and each method of analysis and comparisons between methods. *Subject Headings:* **1. Storm rainfall-frequency relationship 2. Maximum precipitation frequency data 3. Frechet's method 4. Gumbel's method 5. Illinois.**—*M.R.*

11.1–28 551.579(282.252) 551.582.1(282.252)

*†Podvishenskaia, N. Ia., **Gidrologicheskiĭ ocherk rek basseĭnov Zei i Burei.** [Hydrological study of rivers in the Zeya and Bureya River Basins.] *Dal'nevostochnyĭ Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy*, No. 4, pub. Leningrad, **1958.** 117 p. 20 figs., 41 tables, tables in appendix. **DWB**—A thorough summary of the hydrometeorological characteristics of the Zeya and Bureya rivers of the Far Eastern Region of the U.S.S.R. (located on the left bank of the Middle Amur). The 10 chapters cover: I. Physical geography; II. Climatic characteristics; III. Hydrological studies; IV. Water level; V. Water temperature; VI. Ice regime; VII. Mean long period runoff; VIII. Maximum runoff; IX. Minimum runoff; X. Suspended and chemical content of river water. Appended are a catalog of 73 stations for which data are available, and several extensive tables of decadal or monthly values of ice thickness, runoff by months and years, etc. Data are also given in smaller illustrative tables and in numerous isarithm charts for the basins. In the chapter on **Climatic characteristics,** the mean January and July and annual air temperature for 7 stations, basic thermal characteristics of the 3 watersheds in the basin, moisture deficit for 5 stations, mean and monthly relative humidity (5 stations), precipitation variability (17 stations), precipitation characteristics (3 areas), air and soil temperature and depth of freezing (14 stations), etc. are given. The chapter on **Ice regime** contains, in addition to data on thickness and duration of ice, a table of data on total hours of sunshine (9 stations), etc. Statistical presentations of runoff relations, dates of freezing and opening of rivers and other parameters, are given in graphical form. *Subject Headings:* **1. Hydrometeorological study of Far East, U.S.S.R. 2. Climate of Amur Basin 3. Middle Amur, U.S.S.R. 4. Zeya River Basin, U.S.S.R. 5. Bureya River Basin, U.S.S.R.** –*M.R.*

11.1–29 551.586:612.821

*†Herrmann, Horst, **Die Schwüle: eine vergleichende Untersuchung.** [Sultriness: a comparative study.] *Cologne, Universität. Meteorologisches Institut, [Publication]*, No. 5, **1959.** 76 p. 20 figs., tables, 34 refs., 4 eqs.—The 11 different sultriness limits, scales or indicators promulgated by PROTT, W. F. TYLER, DIRKSEN, FLEISCHER, A. V. LANCASTER, G. CASTENS, K. SCHARLAU, H. MROSE, W. LEISTNER, E. KING and others are compared quantitatively as well as qualitatively, and then the data for 77 stations in W. and N.W. Germany for 1950–54 compiled and shown on scatter diagrams based on the several formulas to show scatter and closeness of fit to the theoretical curve. The author's own data are shown on a *t/f* (temp.-humidity) diagram, indicating that a regression line segregates the vast majority of sultry from nonsultry cases. Finally, sultriness maps of N.W. Germany are presented for several of the above definitions, especially KING's, and data for each station for each definition given in tables. The analysis shows that great regional variations exist—regardless of which system is used, but that great variations exist for the same or related places between one system and another. The greatest sultriness occurs in the Rhine Valley and the least along the North Sea Coast and in the higher mountains. *Subject Headings:* **1. Sultriness limits 2. Sultriness, N.W. Germany 3. Northwest Germany.**—*M.R.*

11.1–30 551.579(02)

†Langbein, Walter B. and Hoyt, William G., **Water facts for the nation's future: uses and benefits of hydrologic data programs.** Sponsored by the Conservation Foundation. N. Y., Ronald Press, **1959.** 288 p. 24 figs., tables, bibliog. p. 271–274. **DWB** (M79 L271wa) —A unique book giving a comprehensive outline or review of hydrologic data sources, organization, collection, compilation, analysis, mapping, publication, financing, and use. The overall picture of the government agencies and their programs and financing of data collection and use is outlined and discussed thoroughly. Uses which are also treated extensively are: Power design, levee protection, bridges, irrigation, water supply, drainage, flood control, streamflow forecasting; land management in forests, small watersheds, etc.; urban water problems, wastewater disposal, water rights, multiple purpose projects, farm ponds, sedimentation, etc. Great imagination has been used in treatment of problem of data organization, observation and control. Especially pointed remarks are made about the existing networks and collection of hydrometeorological (hydroclimatic) data (precipitation, snow, evaporation, humidity, wind, runoff, etc.) by the U. S. W. B. and cooperating government agencies; the need for a denser network of paid observers; the need for more studies, not only of storms, floods, etc. but of the hydrologic cycle, evapotranspiration, weather modification (to increase rainfall, snow pack, soil moisture, etc.) and climatic changes which would affect water resources. Another fact is that networks are more dense where population is greatest, but most streams are fed in sparsely inhabited areas where stations are few and far between. Use of radar is helpful but expensive. *Subject Headings:* **1. Hydrologic data control 2. U. S. hydrologic programs.**—*M.R.*

11.1–31 551.582.2:551.543.6:551.553.6(261.2) 551.46

*Verploegh, G., **Klimatologische gegevens van de Nederlandse lichtschepen over de periode 1910–1940, Deel 2, Luchtdruk en wind; zeegang.** [Climatological data of the Netherlands light-vessels over the period 1910–1940, Pt. 2, Air pressure and wind; state of the sea.] *Netherlands. Meteorologisch Instituut, Mededelingen en Verhandelingen*, No. 67, **1958.** 91 p. Mostly tables. In Dutch and English. (For Pt. 1, *see* 8.8–25, Aug. 1957, *MAB.*) **DLC**—Data are tabulated on air pressure, wind and state of the sea, obtained by the 7 Netherlands Lightships (Noord Hinder, Schouwenbank, Maas, Haaks, Terschellengerbank, Doggersbank Zuid and Doggersbank Noord, ranging from 51°37′N to 56°N and 2°36′E to 5°00′E) over the period 1910–1940. Tables are presented on monthly mean values of air pressure; standard deviation of observations with respect to the monthly mean of air pressure; deviation of hourly means with respect to the monthly mean air pressure; monthly frequency distribution of wind force (Beaufort) for 16 directions (magnetic); monthly and annual frequency distribution of wind force for 8 directions in cases per 10,000; mean wind speed in m/sec for 16 directions; speed and direction of mean wind vector and steadiness of the wind for each month; mean square wind speed in $(m/sec)^2$ for 16 directions, magnitude and direction of the mean square

wind vector and steadiness for each month; speed and direction of the hourly mean wind vector for Jan., April, July and October; monthly frequencies of state of sea (code numbers) and actual number of observations of the state of the sea. Graphs of wind roses are also presented. *Subject Headings:* **1. Climatic data for Netherlands lightships 2. Baillie wind roses 3. Lightship observations 4. Netherlands lightships 5. North Sea.**—*A. V.*

MANUALS AND ATLASES

See also: **Atlas of mt. glaciers, N. Hemisphere** (Field et al.), 11.1–106; **Jet stream navigation manuals** (Chandler), 11.1–112; bibliog. of **Reference Works of Past Decade,** p. 101.

11.1–32 551.506.3 551.582.2

*U. S. Weather Bureau. **World Weather Records, 1941–1950.** Wash., D. C., **1959.** 1361 p. chart, almost entirely tables. "Continuation of three previous volumes of World Weather Records, published as Vol. 79, 90, and 105 of *Smithsonian Miscellaneous Collections*, containing data –1920, 1921–1930 and 1931–1940," ed. by H. H. Clayton and F. L. Clayton. (For abstract on previous records, *see* 5A–106, Jan. 1954, *MAB.*) "p. 97–102, Errata in previous volumes of World Weather Records." Price: $4.75 from Gov't. Printing Office, Wash., D. C. **DWB** (M06.1 U587wo)—Carefully homogenized records for 685 stations selected according to the **Réseau Mondial,** and as far as possible in continuity with Vol. 79, 90 and 105 of *Smithsonian Miscellaneous Collections* which cover 1920, 1921–30 and 1931–40, for pressure, temp., rainfall. The present vol. was completed by the U. S. W. B. at the instigation of the IMO Conference of Directors, Washington, D. C., 1947, and with cooperation from >80 countries and many individuals and the Secretariat of the WMO. Editing was done over a period of nearly 10 years by the staff of Blue Hill Observatory under the late C. F. Brooks with John H. Conover as chief editor. The actual tables include station coordinates, monthly mean station pressure, temperature and sea level pressure, and monthly total precip. Entire long-period records with decadal means are included for stations not included in previous volumes. Information on source of data, exposure of instruments, times of observation and methods of adjustment or correction of records are included in 90 pages of Station Notes. Data on lake levels, level and flow of rivers and freezing or thawing of water are also included where available. Monthly mean Wolf-Wolfer (Zurich) relative sunspot numbers are included for period 1941–1954. Sea level pressure data for 10° intersections were not available as in earlier volumes. Stations are arranged under 12 major divisions: Africa, Antarctica, Asia, Australasia, Europe, Indian Ocean, North America, North Atlantic, North Pacific, South America, South Atlantic and South Pacific and then by countries in alphabetical order and by stations (also in alphabetical order). An index lists both stations and countries alphabetically and a station location map and map "number index" is provided. Decadal means are included if 5 or more years of record were available. A 6 page list of errata for previous volumes of **World Weather Records** is also included. *Subject Headings:* **1. World weather records 2. Climatic data for world 3. Marine climatic data. I. Brooks, Charles F. II. Conover, John H.** (*ed.*) **III. World Meteorological Organization.**—*M. R.*

11.1–33 551.501.1:551.506.8(02)

†Seyfert, Franz, **Anleitung zur Durchführung phänologischer Beobachtungen.** [Instructions for making phenological observations.] 3rd. rev. ed. *Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, Veröffentlichungen,* No. 5, **1959.** 160 p. figs., 27 color photos, 70 refs. **DWB** (M(055)G373v), **DLC**—A handy and beautifully illustrated (with color plates) manual of instructions for phenological observers in East Germany, outlining the general purpose of phenological observations, the methods of carrying out same, a list of plants or trees used as indicators and the events to be recorded for each (first bloom, full bloom, first ripe fruit, leaf coloration or leaf fall, etc.), suggestions for analyzing or evaluating phenological observations cartographically and for correlating them with climatological charts, a complete description, with illustrations, of scores of plant indicators, and color photos of 27 of the most important phenological indicators for the region. *Subject Headings:* **1. Phenological observers manuals 2. East Germany.**—*M. R.*

11.1–34 551.508:658.82

Casella, C. F. and Co., London, **Meteorological instruments.** Their *Catalogue*, No. 877, **1958.** 120 p. illus. **DWB** (M/0215 C337m)—A nicely printed and illustrated book giving details of latest meteorological equipment manufactured by Casella & Co. of London, arranged under the following heads: 1) wind velocity and direction, 2) pressure, 3) temperature, 4) humidity, dew-point and frost point, 5) precipitation and evaporation, 6) sunshine, solar radiation and clouds. In addition, charts and registers, humidity tables, handbooks and publication and conversion tables, are listed and illustrated. A good subject index is included. Instructions are given for choice of site and exposure of instruments and requirements for a climatological or synoptic station. *Subject Headings:* **1. Meteorological instruments 2. Instrument catalogs.**—*M.R.*

11.1–35 551.501:551.508:374

Petit, M., **Leçons sur les mesures instrumentales et l'observation en météorologie.** [Course on instrumental measurements and observation in meteorology.] *France. Météorologie Nationale, Notice D*, No. 1219, Oct. **1958.** 170 p. 36 figs., 18 tables, eqs. Mimeo.—This course is intended for engineer trainees at the School of the French Weather Service. First part states some generalities about instrumental measurements which serve as a basis for studying various categories of meteorological instruments. This course includes 9 chapters: 1) Generalities about instrumental measurements (physical units, qualities and defects of instruments, errors in measuring, lag and inertia); 2) Thermometry (scales of temperature, liquid thermometers, vapor-pressure thermometers, bimetal thermometers, resistance thermometers, thermo-couples, problems in measuring air temperature); 3) Barometry (mercury barometers, metallic barometers, hypsometry); 4) Hygrometry (water-evaporation measurement, psychrometry, dew point measurement, organic and chemical hygrometers); 5) Wind measurement (direction—wind vanes; force—anemometers); 6) Measurements relating to clouds and precipitation (height and movement of clouds, precipitation); 7) Visibility measurement; 8) Radiation and sunshine measurements (indicators of sunshine duration, totalizer instruments, actinometers, photo-electric cells); 9) radiosounding instruments. *Subject Headings:* **1. Meteorological instruments 2. Meteorological observation 3. Training course in meteorology 4. French Weather Service.**—*A.V.*

11.1–36 551.578.48:624.182 551.578.483(02)

†Tushinskiĭ, G. K., **Laviny i zashchita ot nikh na geologorazvedochnykh rabotakh.** [Avalanches and protective measures during geological surveys.] Moscow, Gosud. Nauchno-Tekhnik. Izd-vo Literatury po Geologii i Okhrane Nedr, **1957.** 104 p. 30 figs., tables, 56 refs., eqs. **DLC** –Basic facts about snow and avalanches, causes of avalanches, classification, movement, protection (landscaping and engineering measures), and surveys. Data and illustrations are mostly from the Caucasus. Useful nomograms are given for calculating snow-wind-temp.-slope factors for forecasting avalanche hazard. Effect of earthquakes in triggering avalanches, effect of avalanche winds, protection of geological survey parties, preparation of avalanche forecasting charts, botanical indicators of avalanche danger, snow sheds and rescue operations are described and illustrated by photos and drawings. *Subject Headings:* **1. Avalanche protection 2. Avalanche forecasting manuals 3. U.S.S.R.**—*M.R.*

11.1–37 551.515.2:551.509.21(74/75)

§U. S. Weather Bureau, **Hurricanes: a quick reference guide to synoptic charts of hurricanes that threatened or entered the United States, 1949–1958, with Index.** Wash., D. C., rev. Jan. **1959.** 2 vol. Vol. 1, **1949–1953,** and the Index. Vol. 2, **1954–1958.** Looseleaf. Almost entirely charts. (*See* 7I–199, Sept. 1956 and 9.1–32, Jan. 1958, *MAB* for abstracts on earlier issues of same title.) **DWB** (M15.2 U587hq)—The index (40 p.) allows the user of this voluminous guide to locate synoptic charts for any specific hurricane which affected the U. S. east of the Mississippi or along the Atlantic and Gulf Coasts and the Atlantic and Gulf west of 60°W or north of 15°N, in the 1949–58 decade. Each of these index pages shows the name, date and trajectory of every main tropical cyclone and the location of the center at 0030, 0630, 1230 or 1830 Z within a given 5° square of lat. and long. Following this index are surface charts for 6-hourly periods and 500 mb charts for 12-hourly periods for these hurricanes,

arranged chronologically. This manual enables one to determine for a reported tropical storm position, all other storms and their trajectories which have occurred in the area during the decade 1949–58, and to find detailed analyzed synoptic surface and upper air charts for analogous situations if any exist. *Subject Headings:* **1. Hurricane analog guide 2. Synoptic charts of hurricanes 3. Hurricanes, U. S. East Coast** (1949–58).—*M.R.*

11.1–38 551.515.23:551.506.3(265)

*Chin, P. C., **Tropical cyclones in the Western Pacific and China Sea area, 1884 to 1955.** *Hong Kong. Royal Observatory,* [*Publication*] *R.O.T.M.* 7, **1958.** 4 p. of text. Almost entirely charts (85), 12 refs. 5 p. tables at end.—"Rev. ed. of paper by L. Starbuck, **Statistical survey of typhoons and tropical depressions in the Western Pacific and China Sea area from 1884–1947,** pub. **1951** (*see* 3.5–164, May 1952, *MAB*). **DWB** (M15.2 G539tr)—By supplementing STARBUCK's 1951 analysis and compilation with storm data for 1941–45, missing records for 1897–1940, discovered in Hong Kong in 1953, and subsequent data published by many services, a complete 70 year series of tracks of typhoons and statistics obtained from these tracks has been prepared and published in large format. Monthly charts are presented for Jan.–April, inclusive, but several (2 to 7) charts a month are used for the subsequent months, typical typhoon tracks and tracks of cyclones which followed unusual tracks, and those giving rise to persistent gales at Hong Kong (July–Nov.). Tables (on charts) show number of occurrences for each $2\frac{1}{2}°$ square by monthly frequencies of occurrence and of direction of motion of tropical cyclones (1884–1953), percentage frequency of speeds of motion of typhoons for each $2\frac{1}{2}°$ square (on many colored histograms) by months, points of recurvature of tropical cyclones and, lastly, tables showing times of date circles for all tracks. This is a superb analysis for the entire Far East area (105°–150°E and 5° to 30°N). *Subject Headings:* **1. Tropical cyclone statistics 2. Typhoon tracks 3. Anomalous typhoon tracks 4. Long period records 5. Western Pacific Ocean 6. China Sea 7. Hong Kong. I. Starbuck, L.** —*M.R.*

GENERAL GEOPHYSICS AND METEOROLOGY

GEOPHYSICS

See: **Geophysics** (Howell), 11.1–13; **Geophysics glossaries,** 11.1–90.

IGY

See also: **Soviet Antarctic IGY expeditions,** 11.1–8.

11.1–39 551.521.14:551.594.5:551.506.22

O mezhdunarodnoĭ programme issledovaniĭ poliarnykh siianiĭ i svecheniia nochnogo neba. [International research program on auroras and night sky glow.] *Akademiia Nauk SSSR. Mezhduvedomstvennyĭ Komitet po Provedeniiu Mezhdunarodnogo Geofizicheskogo Goda, Informatsionnyĭ Biulleten'*, No. 3:10–18, **1957. DLC**—Excerpts from the resolution of the Rome conference and S. CHAPMAN's report at the Barcelona conference of the Special Committee on the IGY, outlining the international research program on auroras and night sky glow. Auroral investigation was to include: 1) Division of the globe into 5 auroral regions; 2) Basic methods of investigation (a) visual observation (organization, observation methods, equipment), (b) photographic observations, (c) photometric studies, (d) spectrographic investigations; 3) Radar observations; 4) Investigations of radio wave absorption; 5) Equipment for vertical sounding of the ionosphere; 6) Investigation by means of rockets; 7) Geomagnetic investigations; 8) Phenomena of atmospheric electricity connected with auroras; 9) Sound phenomena during auroras. A less elaborate program for night airglow research was outlined. *Subject Headings:* **1. IGY airglow program 2. IGY aurora program.**—*A.M.P.*

11.1–40 551.521.17:537.531 551.506.22

Bruzek, A. (*Fraunhofer Inst., Freiburg i Br.*), **Das Internationale Geophysikalische Jahr XVIII. Die Ultraviolett- und Röntgenstrahlung der Sonne.** [International Geophysical

Year, Pt. 18, The ultraviolet and X-ray radiation of the sun.] *Die Umschau*, 58(11):338–341, June **1958.** 2 figs. **DWB, DLC**—The absorption of X-ray and UV-radiation from the sun by the atmosphere during the formation of ionospheric layer, the vertical distribution of oxygen in the atmosphere, and the radiation absorption of O_2 are discussed. At 1215.7 Å there is a narrow window in the atmosphere in which O_2 absorption coincides precisely with the simple radiation of the extreme UV which can reach atmospheric layers below 90 km. The results of investigations of the UV- and X-ray radiation of the sun by means of spectrographs and photon counters, mounted on rockets, are summarized. The continuous spectrum was photographed to 1500 Å and the Fraunhofer lines up to 2085 Å were observed. Below 2000 Å 1000 lines were determined. The shortest wave identified hitherto was a multiple of silicicum at 1700 Å. Emission lines were photographed between 1892 Å and 977 Å. The strongest was Lyman α-line of H_2 and 1215.7 Å. The other lines were derived from Hl, C, N, O, Al, Si, P, S and Fe which are partly highly ionized. The sun continuously sends out X-rays lying in the range of 10–100 Å. The intensity between 44 and 100 Å corresponds to a temperature of 500,000°. Studies with the aid of rockoons have shown that during chromospheric eruptions the X-rays increase toward the shorter wave lengths, but in no instance did Lyman-α intensification occur, so that the Mögel-Dellinger effect results from additional hard X-ray radiation. The measurement of UV- and X-ray radiation with satellite (Sputnik II) is described briefly. *Subject Headings:* **1. Ultraviolet solar radiation 2. X-radiation 3. IGY solar radiation program.**—*I.L.D.*

11.1–41 551.506.22:551.5(99)

Dubois, Jacques, **Météorologie (Station Charcot).** [Meteorology at the Charcot Station.] (In: International Geophysical Year, 1957/1958. Comité National Français. Sous-Comité Antarctique Français, **Rapport d'Activité des Expéditions Antarctiques Françaises.** Paris, June **1958.** p. 81–83. table.)—Description of the outfit and its functioning at the Charcot Station, and of the measurements made. The monthly mean values of the main meteorological elements, observed during the period February 1957–January 1958, are mentioned in a table. *Subject Headings:* **1. Antarctic weather stations 2. Charcot Station, Antarctica.**—*A.V.*

11.1–42 551.506.22:550.38(99)

Lebeau, André, **Magnétisme terrestre (Base Dumont d'Urville).** [Earth's magnetism at the Dumont d'Urville Base.] (In: International Geophysical Year, 1957/1958. Comité National Français. Sous-Comité Antarctique Français, **Rapport d'Activité des Expéditions Antarctiques Françaises.** Paris, June **1958.** p. 51–52.) Account of the geomagnetic program at the Dumont d'Urville Base. It included the recording of the three elements X, Y, Z, determining the earth's field by means of a Lacour magnetograph, absolute measurements by means of a Q.H.M., a B.M.Z. and a sonde-theodolite, and the setting of a photo-electric magnetograph. *Subject Headings:* **1. IGY geomagnetic program 2. Dumont d'Urville Base, Antarctica.**—*A.V.*

11.1–43 551.311.1:550.3:061.3

Grave, N. A., **O podgotovke k issledovaniiam v raĭone khrebta Suntar-Khaiata.** [Preparation for investigations in the Suntar-Khayata mountain range region.] *Akademiia Nauk SSSR. Mezhduvedomstvennyĭ Komitet po Provedeniiu Mezhdunarodnogo Geofizicheskogo Goda, Informatsionnyĭ Biulleten'*, No. 3:68–73, **1957.** 2 figs., 2 refs. **DLC**—In accordance with the IGY program, a glaciological station for the study of glaciers, frozen ground and rocks and their dynamics, depending on various physico-geographical and geological properties characteristic of the extreme northeast of the U.S.S.R., will be organized in the Suntar-Khayata mountain range (2500–2959 m altitude) in Yakut A.S.S.R. The range is the orographic divide of air masses of Pacific and continental origin and is a region of considerable contemporary glaciation, situated 150 km from the Oimyakon Plateau, where the lowest temperature of the Northern Hemisphere has been recorded. The site of the station and the progress of its construction are discussed. A schematic chart showing the distribution of glaciers on the mountain range, the site of the future station and of the temporary camp and storage depots is included. *Subject Headings:* **1. IGY glaciological program 2. Suntar-Khayata mountains, U.S.S.R.**—*A.M.P.*

11.1–44 551.506.22

International Geophysical Year, 1957/1958, **CSAGI guide to IGY World Data Centres.** Its *Annals*, Vol. 7, Pt. 2, issued London, Pergamon Press, (**1958?**). p. 143–373. forms. Text in English and French. **DWB** (M06.22 I61ann)—Complete and systematically arranged information and data on World Data Centres for IGY in the 13 disciplines, plus extensive general information on the guide, the data center and the agreements reached at Moscow in Aug. 1958 at the 5th CSAGI meeting (in Ch. I). Ch. II gives details of the 3 data centers for Meteorology-A—Asheville, N. C. (U. S.), B—Moscow and C—Geneva (WMO); the programs or types of data being collected, and the centers to which each of 60 countries have agreed to send their data. Ch. III does the same for Geomagnetism; IV, Aurora and airglow; V, Ionosphere; VI, Solar Activity; VII, Cosmic Rays; VIII, Longitude and Latitude; IX, Glaciology; X, Oceanography; XI, Rockets and Satellites; XII, Gravimetry and XIII, Nuclear radiation. Extensive lists of stations reporting to each center under each discipline are included. *Subject Heading:* **1. IGY World Data Center guide.**—*M.R.*

WMO-IUGG

11.1–45 551.5:061.3

World Meteorological Organization. Commission for Bibliography and Publications, **Abridged final report of the second session, Paris, Nov. 5–22, 1957.** *World Meteorological Organization, [Publication] WMO*, No. 81. RP. 34, **1958.** 33 p. Price: Sw. fr. 4. **DWB** (M(06) W927p)—The names of the official delegates of 10 countries attending the Paris meeting of the Commission for Bibliography and Publications and the 17 other attendants, the transactions and resolutions adopted, the details of the recommended amendments to the 551.5 breakdown of the U.D.C., amendments to the Guide to Meteorological Library Practice, Terms of Reference for CB & P, amendments to the Technical Regulations Regarding Bibliography and Publications, and proposal for a World Meteorological Bibliography, and progress on the International Meteorological Vocabulary and Multilingual Meteorological Nomenclature are included. *Subject Headings:* **1. WMO Bibliography and Publications Commission meetings 2. UDC for meteorology.**—*M.R.*

11.1–46 551.589

†Stelmaszczyk, Danuta, **O zadaniach i kierunkach rozwoju klimatologii dynamicznej (w świetle materiałow przedstawionych na II sesji komisji klimatologicznej ŚOM).** [Tasks and direction of the development of dynamic climatology (based on material presented to the 2nd session of the WMO Commission on Climatology).] *Przegląd Geofizyczny*, Warsaw, 3(1):49–55, **1958.** bibliog. p. 53–55. **DWB, DLC**—A review and summarization of material presented to the 2d session of the Climatological Commission of the WMO in Washington in January 1957 by a working group of the Committee appointed during the 1st session of the Commission in 1953. The following problems were included: 1) long range forecasting, 2) synoptic types, 3) rain forecasting (on basis of mathematical computation), 4) general atmospheric circulation, 5) climatology of upper air layers and 6) climatic variations. A bibliography on dynamic climatology and a list of the main elements of atmospheric dynamics were also prepared. After a detailed discussion, resolutions were adopted which emphasized the importance of IGY for the further development of climatology. *Subject Headings:* **1. Dynamic climatology 2. WMO Climatological Commission.**—*A.M.P.*

11.1–47 550.3:061.3

Stagg, J. M. (*Met. Office, London*), **Some problems of international co-operation in geophysics.** (In: Beer, Arthur (*ed.*), **Vistas in astronomy.** London, Pergamon Press, **1955.** Vol. 1:26–29.) **DLC** (QB3.B35)—To provide for new and rapidly developing subjects of great importance in geophysical science it is desirable that the constituent associations of the International Union of Geodesy and Geophysics should be modernized. This might also serve to keep the size of assemblies and the general administration of the Union within such bounds as can be effectively handled by an honorary secretary. The arrangements of administering grants-in-aid could also be simplified. An important aspect of international co-operation is to maintain efficiently those permanent services of the Union whose function it is to collect

and publish observational data and to provide standards, and individual countries should be encouraged to take responsibility for particular services. *Subject Headings:* **1. Geophysical research 2. International Union of Geodesy and Geophysics (I.U.G.G.).**—*Author's abstract.*

11.1–48 551.5:550.3:061.3

O rabote XI General'noĭ assamblei Mezhdunarodnogo geodezicheskogo i geofizicheskogo soiuza. [Work of the XIth General Assembly of the International Union of Geodesy and Geophysics.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 2:283–288, Feb. **1958. DLC**—The 11th General Assembly of the International Union of Geodesy and Geophysics was held in Toronto, Canada, during Sept. 3–14, 1957. This report contains brief summaries of some of the papers presented at the sessions of the Association of Meteorology and of the Association of Seismology and Physics of the Interior of the Earth (structure of the earth's crust on continents and oceans, and seismological instrumentation and microseisms). Names of elected officers and Soviet participants are given. Some of the papers briefly summarized are: forecasting of meteorological processes over large areas (P. THOMPSON); use of numerical forecasts of pressure field for determining actual weather phenomena (SAWYER), etc. In regard to microseisms mention is made of DARBYSHIRE'S paper on the refraction of microseisms associated with storms, the formation and propagation of microseisms associated with hurricane (D. S. CARDER and A. EPPLEY), mechanism of microseism formation during storms at sea (NANDA), distribution of pulsations in groups of microseism oscillations (H. JENSEN), etc. *Subject Headings:* **1. I.U.G.G. meeting, Toronto, 1957 2. Conferences 3. Toronto, Canada.**—*I.L.D.*

ARCTIC RESEARCH

See also: **Soil temps., Canadian Arctic** (Crawford, Legget), 11.1–226; **Wind chill, Canadian Arctic** (Thomas, Boyd), **11.1–238.**

11.1–49 551.542.1:551.588.5(988)

Hamilton, R. A. (*Met. Office, Prestwick*), **The pressure gradient at the edge of an ice sheet.** *Royal Meteorological Society, Quarterly Journal*, 85(364):166–167, April **1959.** 3 refs. **DWB, DLC**—Mean sea level pressures on the N.E. coast of Greenland are compared with those of a low level station within the edge of the inland ice. The comparison indicates that there is no evidence of an unusually high pressure gradient near the ice edge. *Subject Headings:* **1. Pressure gradient 2. Greenland Ice Cap 3. Greenland.**—*Author's abstract.*

11.1–50 551.543.1:551.588.5(988)

Hamilton, R. A. (*Met. Office, Prestwick*), **The diurnal variation of pressure on the Greenland ice sheet.** *Royal Meteorological Society, Quarterly Journal*, 85(364):168–170, April **1959.** fig., 5 refs. **DWB, DLC**—The curve of the diurnal pressure variation at 'Northice' shows a marked minimum in summer and autumn at about 0430 GMT. Maxima occur at 1300 and 2100 separated by a subsidiary minimum at 1730 GMT. The range is 0.3 mb. *Subject Headings:* **1. Diurnal pressure variations 2. Greenland Ice Cap 3. Greenland.**—*Author's abstract.*

11.1–51 91.04(98) 551.506.5(98)

Gakkel', Ia. Ia., **Nauka i osvoenie Arktiki (k sorokaletiiu sovetskikh issledovanii).** [Science and the conquest of the Arctic: 40th anniversary of Soviet investigations.] Leningrad, Izdatvo Morskoĭ Transport, **1957.** 131 p. numerous photos and figs. **DWB** (919.8 G145na)—A detailed and thorough monograph covering each Soviet Arctic expedition since 1918, with emphasis on the scientific results of the drifting stations (meteorological, oceanographic, glaciological, geomagnetic, etc.). The history of Russian explorations in the Arctic is covered in a long introduction. Then in Pt. I the several pre-war expeditions: 2nd Polar Year, Siberiakov, Severnyĭ Polius, Northern Sea Route, etc. and the post-war expeditions: by air, drifting stations, as well as oceanographic and meteorological network observations over entire polar basin; and forecasting of weather and ice conditions for navigation in Arctic Seas, magnetic and ionospheric observations, etc. are discussed. Pt. II discusses a number of problems for future investigation: the Lomonosov submarine ridge, energy balance of earth

and planets, paleogeography, and, lastly, the IGY. *Subject Headings:* **1. Soviet Arctic scientific investigations 2. Arctic expeditions.**—*M.R.*

11.1–52 551.58:355 551.324.24(988)

Frost, R. E., **A reconnaissance for a southern Greenland Ice-Cap access for military purposes.** *U. S. Snow Ice and Permafrost Research Establishment, Technical Report*, 46, April **1957.** 18 p. 8 figs. (incl. photos), 7 refs. **DWB**—Deals mostly with geological and geographic problems. Aspects of military climatology appear in short notes on: ice conditions for the establishment of ports, tides, icebergs, glaciers, crevassing, permafrost, frost upheaval, snow fences, spring melt runoff and slush conditions, which are especially severe in the marginal zone of the ice cap during the summer. Very general criteria are given on how to select optimum locations, considering these factors. *Subject Headings:* **1. Military climatology 2. Greenland Ice Cap 3. Greenland.**—*A.A.*

11.1–53 551.510.535:551.510.62

Driatskiĭ, V. M. and Besprozvannaia, A. S., **Ionospheric conditions in the circumpolar region.** *Annales de Géophysique*, Paris, 14(4):438–455, Oct./Dec. **1958.** 13 figs., 11 photos, 3 refs. **DLC**—Ionospheric observations from the drifting station SP-3 during the period May 15, 1954 to April 14, 1955, and especially observations made during the Arctic night, are given. The authors give a short description of the characteristics of the apparatus and of the magnetic field state. The results of the observations are given for the normal E layer, the E_s sporadic ionization, the $E2_s$ sporadic ionization, the normal F1 and F2 layers and the anomalous absorption of radio waves. Of greatest interest are the results received under the conditions of the Arctic night in connection with the F2 layer. The critical frequency for F2 layer during this period was unexpectedly high, reaching 5–6 mc at times. The evident sporadic type of the layer being expressed in the sharp change of the critical frequency in the layer from hour to hour and from day to day, a definite connection with the state of the magnetic field proves its corpuscular nature. At the same time, the distinct shape of height-frequency diagrams, normal for reflections from the F2-layer, stipulated by a wave radiation, can hardly be taken to agree with the corpuscular conception. It is still impossible to solve the problem of the nature of observed high ionization in the F2-layer during a Polar night. *Subject Headings:* **1. Ionospheric conditions in Polar regions 2. E layer 3. F layers 4. Anomalous radio wave absorption.**—*A.V.*

ANTARCTIC RESEARCH

See also: "Ob" **Antarctic Expedition, 1955–56,** 11.1–8; **Aerology, Antarctica** (Schumacher), **11.1–21.**

11.1–54 551.506:551.521.18(99)

*Gergen, John L., **Observations of atmospheric infrared radiation over McMurdo Sound, Antarctica.** Minnesota, Univ. School of Physics, Contract Nonr-710(22), Technical Report [Unnumbered], Dec. **1958.** 38 p. 15 figs., 13 tables, 5 refs. **DWB** (M(051) M665at)—During the June–July 1956 flights over McMurdo Sound, Antarctica, synoptic measurements of infrared radiation were made for the sake of comparison with similar radiation studies made over Minneapolis at 45°N. In 1957 it was noticed that extreme variations in radiation existed and the equivalent radiation temperature over the Antarctic was used to find an answer for the causes of this variation. Detailed results of this work include the observed data and a discussion of the results of each flight. *Subject Headings:* **1. Infrared radiation measurements 2. Radiation variations 3. McMurdo Sound, Antarctica.**—*N.N.*

11.1–55 551.506.5(99) 551.506.7(99)

*Australian National Antarctic Research Expedition, **A.N.A.R.E. Reports, Ser. D, Vol. 7, Meteorology, Mawson, Heard and Macquarie Island, 1954.** Prepared by the Bureau of Meteorology. Pub. Melbourne, **1957.** Also: **Vol. 8, Meteorology, Mawson and Macquarie Island, 1955,** pub. June **1958.** Each about 170 p. mostly tables. **DLC.** (For abstracts

on previous issues, *see* 5.A–67 and 7.9–84, Jan. 1954 and Sept. 1956, *MAB.*) Standard volumes of tables containing 3-hourly surface and upper air (radiosonde, rawin and pibal) data for Macquarie Island and Mawson (67°36′S, 62°53′E) in 1954 and 1955 and for Heard Island in 1954. Pressure, temperature, dew point, wind, cloud, precipitation and sunshine, visibility, weather, height of low cloud, cloud type and movement, upper air wind, temperature, humidity and pressure, tropopause data, etc. presented as actual observation and as frequencies for single or combined elements. *Subject Headings:* **1. Observational data 2. Upper air wind data 3. Tropopause data 4. Australian National Antarctic Research Expeditions 5. Heard Island 6. Macquarie Island 7. Mawson, Antarctica. I. Australia. Bureau of Meteorology.**—*M.R.*

11.1–56 551.509.3:355(99)

Lanterman, W. S. (*Met. Officer, Commander U. S. Naval Support Force, Antarctica*), **Operational meteorological problems in the Antarctic. 1958.** 5 p. 9 figs. Typescript. **DWB** (M:999 L296op)—Problems facing the meteorologist forecasting for operational purposes in the Antarctic are discussed. Some possible means of obtaining meteorological data over areas from which information is not presently available are outlined. This information is required for the preparation of operations forecasts for units in the Antarctic. To be of maximum utility these data must be analyzed and the analyses disseminated to those units forecasting for operations in the Antarctic. The use of facsimile for this purpose is discussed briefly. *Subject Headings:* **1. Antarctic weather forecasting 2. Operational forecasts 3. Antarctica.**—*Author's abstract.*

11.1–57 551.506.9:551.585(26)

Bugaev, V. A., **Meridional'nyĭ meteorologicheskiĭ razrez.** [Meridional meteorological cross section.] *Meteorologiia i Gidrologiia*, Leningrad, No. 7:26–30, July **1958. DWB, DLC**—During the voyage of the "Kooperatsiia" to Antarctica, meteorological observations were begun on Nov. 10, 1957, off the coast of Portugal at 40°N lat. and completed at the ice field in the vicinity of Mirny, on Dec. 25, 1957. Instrumental readings were made every 3 hrs, and also surface water temperatures were taken. These observations provide a meridional cross section through different climatic zones for a relatively short period. A detailed account is given of the daily weather, including air mass characteristics, atmospheric temperature and humidity, and wind velocities and directions during the passage through the various wind zones and climatic zones from moderate latitudes in the Northern Hemisphere up to the arrival at Antarctica. *Subject Headings:* **1. Meridional cross sections 2. Climatic zones 3. Observational data 4. Atlantic Ocean.**—*I.L.D.*

11.1–58 550.3:061.3(99)

International Council of Scientific Unions. Special Committee for Antarctic Research, **Nouvelles de l'A.G.I. Les activités dans l'Antarctique en 1959.** [News of the IGY. Activities in the Antarctic in 1959.] *International Scientific Radio Union, Bulletin d'Information*, N°. 112:81–83, Nov./Dec. **1958. DLC**—Survey of the investigation program in the Antarctic in 1959 planned by several countries. During this year, Antarctic researches will be maintained at the same level as during the period of the IGY 1957/58. *Subject Headings:* **1. IGY Antarctic program 2. Antarctic research .**—*A.V.*

11.1–59 551.4 91.04(99)

†Vsesoiuznoe Geograficheskoe Obshchestvo SSSR, **Antarktika: materialy po istorii issledovaniia i po fizicheskoĭ geografii.** [Antarctica: history of exploration and physical geography.] Ed. by E. N. Pavlovskiĭ and S. V. Kalesnik. Moscow, Gos. izd-vo Geogr. Lit-ry, **1958.** 455 p. figs., tables, bibliogs. throughout. **DLC** (G860.G4)—The history of the exploration and expeditions to the Antarctic is thoroughly summarized in a series of articles by E. E. Shvede, A. Z. Aleĭner, D. G. Panov, and V. Kh. Buinitskiĭ. The articles deal with the discoveries of Bellingshausen in 1819–21, geographical expeditions of the 19th Century, cartography of 19th and 20th Centuries (to 1950), geological structure of the Antarctic, geomorphological character of the Antarctic, contemporary glaciation, sea water and ice and, finally, geographical nomenclature. Each chapter has an excellent bibliography appended, with ample reference to non-Soviet sources. *Subject Headings:* **1. Antarctic exploration**

2. Physical geography, Antarctica 3. Antarctica. I. Pavlovskiĭ, Evgeniĭ Nikanorovich (*ed.*) II. Kalesnik, Stanislav Vikent'evich (*ed.*).—*M.R.*

SERVICES AND SOCIETIES

11.1–60 551.5:061.1(667)

Walker, H. O., **Meteorology in Ghana.** *World Meteorological Organization, WMO Bulletin*, 7(3):118–121, July **1958.** 2 photos. **DWB**—Ghana became a member of WMO on June 6, 1957. It lies between 5° and 11°N, and covers 90,000 sq mi, consisting of the former Gold Coast and Togoland. The earliest observations were begun in 1886. After World War I, the Agricultural Department took over responsibility for operation of the climatology stations. A forecast office was set up in World War II at Accra and 10 synoptic stations, 20 climatology and 70 rainfall stations. The present networks and program, headquarters, training and man power and international cooperation are outlined and illustrated. *Subject Headings:* **1. Ghana Meteorological Service 2. Meteorological networks 3. Ghana.**—*M.R.*

11.1–61 551.5:061.1(584)

Starodubtsev, S. V., **Razvitie fiziko-matematicheskikh nauk v Uzbekistane za gody Sovetskoĭ vlasti (1917–1957).** [Development of the physical-mathematical sciences in Uzbekistan during the years of the Soviet regime (1917–1957).] *Akademiia Nauk UzSSR, Izvestiia, Ser. Fiziko-Matematich. Nauk*, No. 4:5–14, **1957.**—The developments in the physical-mathematical sciences in Uzbekistan since the October Revolution are summarized. The achievements in the fields of mathematics and mechanics, geophysics, physics and astronomy are described and the names of the more important investigators and their contributions are listed. The Turkestan Meteorological Institute was established in 1921 and the Weather Bureau was organized in 1922. The direction in which meteorological investigations are being pursued are as follows: actinometric studies including radiative flux in the free atmosphere; heat balance and microclimate of various landscapes of Central Asia; heat exchange and microclimate of the Central Asiatic sand deserts; hydrometeorologic effectiveness of irrigation of semi-deserts; evaporation from soil and vegetation; climatology of Central Asia; synoptic processes of Central Asia; theories of frontogenesis; methods of hydrodynamic forecasting of synoptic processes, magnetic registration; and studies of the earth's geomagnetic pole, etc. *Subject Headings:* **1. Meteorological institutions 2. Turkistan Weather Bureau 3. Turkistan.** —*I.L.D.*

11.1–62 551.5:061.2

Schmidt, G., **Tagung der Meteorologischen Gesellschaft in der DDR.** [Meeting of the Meteorological Society in East Germany.] *Petermanns Geographische Mitteilungen*, Gotha, 102(2):117, **1958. DLC**—The first session of the newly organized East German Meteorological Society was held on Oct. 14–16, 1957 in the German Academy of Science at Berlin. Hermann Flohn spoke on **Basic questions of synoptic meteorology** and on **New investigations of the mechanism of a summer monsoon in south and central Asia,** based on recent aerological observations which change classical concepts of air mass properties; S. P. Khromov discussed development of **Climatological research in the U.S.S.R.;** M. I. Budyko gave a lecture on the **Methods of calculating surface temp. from the heat balance;** H. Tollner talked on **Mountain summer climate in Eastern Alps in relation to glacier ablation;** A. Gregor on **City climate** and A. Mäde and N. S. Schöne gave papers on other phases of local climatology. *Subject Headings:* **1. East German Meteorological Society 2. Berlin, Germany. I. Flohn, H. II. Khromov, S. P.**—*M.R.*

11.1–63 551.5:061.2

Hoddinott, M. H. O., **Chester Meteorological Society.** *Weather*, London, 12(12):386, Dec. **1957. DWB, DLC**—Fourth Session of the Chester Meteorological Society met on May 9, 1958. During the past 3 years the Society tried scientific lectures (which were poorly attended), held business and informal discussion meetings, collected and published data from the county and North Wales, conducted a public information service, and instrument repair, development and advisory service (for members' barographs, etc.). A tribute is paid to

S. E. Ashmore who died Oct. 1956. He was very active in establishing the society and a constant advisor. *Subject Headings:* **1. Chester Meteorological Society 2. Local meteorological societies 3. Chester, Eng. I. Ashmore, S. E.**—*M.R.*

11.1–64 551.48:061.1(43)

German Hydrographic Institute. *Science*, Wash., D. C., 128(3336):1422, Dec. 5, **1958. DLC**—History of the Deutsches Hydrographisches Institut (founded in 1861), present organization, leadership and activities (including IGY), publications, ships, and general mission are reviewed. The library has 60,000 volumes. G. Boehnecke is present president, with a staff of 500 persons, including 40 scientists and engineers. *Subject Headings:* **1. German Hydrographic Institute 2. Hydrographic services.**—*M.R.*

SYMPOSIA AND CONFERENCES

See also: **Fire Weather Conf.**, 11.1–3; **Climatic change symposium**, 11.1–5; **ISRU conf.**, 11.1–22; **IUGG conf.**, 11.1–48; **Fire Control Conf.**, 11.1–123; **Bioclimatic Conf., Vienna (Pieślak)**, **11.1–295.**

11.1–65 551.586:634.94:061.2

Péczely, György, **A Magyar Meteorológiai Társaság 1956. évi győri vándorgyűlése.** [The Hungarian Meteorological Society's 1956 field conference at Győr.] *Időjárás*, Budapest, 60(5):325–327, Sept./Oct. **1956. DLC**—It is a recently established practice of the Hungarian Meteorological Society to hold its meetings in various cities of Hungary rather than at the capital only. This paper contains summaries of the lectures and discussions at the second such field conference which was held in Győr in August 1956. The subject of the meeting was forest meteorology. *Subject Headings:* **1. Forest meteorology conferences 2. Győr, Hungary.**—*G.T.*

11.1–66 621.396.8:523.162(08)

Radio Astronomy Symposium, Jodrell Bank, Aug. 1955, **[Abstracts in English of a selection of papers, delivered at this Symposium]**. Each abstract repaged. figs., tables, refs., eqs. Photostats of typescript. **DWB** (621.384 I61p)—This collection of photostats prepared from working papers of the Jodrell Bank symposium on radio astronomy contains eleven papers submitted by the Russian delegation (also one from Czechoslovakia and one from Japan). All abstracts are in English; they are either complete texts or extensive summaries including numerous data and mathematical deductions. The subjects discussed are methods used by Soviet scientists for identifying and analyzing solar, planetary and galactic radio radiation and results achieved in interpreting the mechanisms producing such radiation. As a whole, the collection conveys a good idea of the present state of Soviet research in the field of radio astronomy. The length of the papers (or summaries) varies between 2 and 12 typewritten pages. The titles are as follows: Abstract No. 3, Link, F.: **Possible proofs of the lunar atmosphere.** No. 32, Getmantsev, G. G.; Stankevich, K. S. and Troitskiĭ, V. S.: **Detection of monochromatic radioemission of deuterium from the center of the Galaxy on wavelengths of 91.6 cm.** No. 33, Ginzburg, V. L.: **The nature of cosmic radioemission and the origin of cosmic rays.** No. 34, Troitskiĭ, V. S. and Khaikin, S. E.: **Radioemission from the moon and the nature of its surface.** No. 35, Shklovskiĭ, I. S.: **Optical emission from the Crab nebula in the continuous spectrum.** No. 36, Shklovskiĭ, I. S.: **Some problems of the metagalactic radioemission.** No. 37, Vitkevich, V. V.: **Results of observations of the scattering of radio waves on the electronic inhomogeneities of the solar corona.** No. 38, Vitkevich, V. V.: **Disturbed radioemission from the sun—as a sum of small monochromatic peaks.** No. 52, Hatanaka, Takeo: **Polarization of solar radio bursts.** No. 61, Chikhachev, B. M.: **A survey of soviet observations of the radioemission from the sun during solar eclipses.** No. 62, Shain, G. A., Pickelner, S. B. and Ikhsanov, R. N.: **The measurement of the polarization of the Crab nebula.** No. 63, Vitkevich, V. V.: **Burst of solar radioemission on Sept. 26, 1952.** No. 64, Shklovskiĭ, I. S.: **On the nature of the emission from the galaxy NGC 4486.** *Subject Headings:* **1. Radio astronomy symposia 2. Soviet progress in radio astronomy. I. International Astronomical Union.**—*G.T.*

11.1–67 551.579:061.3

Conference on New Research Methods in Hydrology, Scripps Institution of Oceanography, La Jolla, Calif., Feb. 2–3, 1957, **Proceedings.** Ed. by Harmon Craig. Issued by Committee on Research in Water Resources, Univ. of California. [1957.] 37 p. tables, 19 refs., eqs. **DWB** (M79 C748)—Abstracts and discussions of papers given at a 2-day conference on new electronic tools for hydrologic studies and on their application to problems of ground water geology and hydrology. Evapotranspiration studies at Lake Mead, use of radioactive and chemical tracers (deuterium and tritium), continental and oceanic water balance studies using data from bomb tests and cosmic ray tritium. Bibliography on induced polarization, evaporation suppression using hexadecanol, ground water tracers, deuterium and O^{18} studies and tritium studies, is appended. *Subject Headings:* **1. Hydrological research techniques 2. Radioactive tracer techniques. I. Craig, Harmon,** (*ed.*).—*M.R.*

11.1–68 551.46(08)

National Research Council. Committee on Undersea Warfare, **Proceedings of the Symposium on Aspects of Deep-Sea Research, National Academy of Sciences—National Research Council, Wash., D. C., Feb. 29–March 1, 1956.** William S. von Arx, ed. Prepared for the Office of Naval Research. *National Research Council, Wash., D. C., Publication,* No. 473, **1957.** 181 p. figs. (For listing of contents, *see* Pt. III, p. 152, Jan. 1959, *MAB.* All articles abstracted separately.) **DWB** (551.46 N277pr), **DLC** (GC57.N33, 1956)—This document represents the proceedings of a symposium sponsored jointly by the Office of Naval Research and the Committee on Undersea Warfare of the National Academy of Sciences—National Research Council and held February 29–March 1, 1956. Participants were drawn from various United States and foreign laboratories and the 25 papers presented deal with physical and chemical oceanographic problems relating to the deep sea. Also included are discussions of the papers and a summary of the symposium which draws attention to a number of factors important in more fully opening up the deep regions of the sea to scientific study. *Subject Heading:* **1. Deep sea research symposia. I. National Academy of Sciences II. von Arx, William S.** (*ed.*).—*Author's abstract.*

EDUCATION, HISTORY AND BIOGRAPHY

EDUCATION

See also: **Training courses in met.** (Petit), 11.1–35.

11.1–69 551.5:378.4

Vittori Antisari, Ottavio, **La situazione della meteorologia scientifica in Italia.** [State of scientific meteorology in Italy.] *Rivista di Meteorologia Aeronautica,* Rome, 17(4):38, Oct./Dec. **1957. DWB**—A note on the unprofessional conduct of a so-called "expert in meteorology." This incident led to comments on the status of meteorology in Italy compared to the status of nuclear physics, medicine, etc. which command public respect and require high standards for experts. The Italian universities do not give proper place to meteorology in their research, failing to heed the advice of PLANCK in 1914 who ranked meteorological problems along with those of chemistry and physics of matter and electricity as the most fundamental problems of science. *Subject Headings:* **1. Weather broadcasting 2. Training in meteorology.**—*M.R.*

11.1–70 551.5:37 551.579:37

L'vov, A. M., **Kursy povysheniia kvalifikatsii rukovodiashchikh rabotnikov gidrometsluzhby.** [Courses to raise the qualifications of supervisors in the Hydrometeorological Service.] *Meteorologiia i Gidrologiia,* Leningrad, No. 1:61–62, Jan. **1956. DWB, DLC**—A description is given of the educational program carried out during July–Sept. 1955 in the Valdai Hydrological Laboratory of the State Hydrometeorological Institute. In contrast to previous years these courses were adapted to the special interests of the students so that they were more specialized. The students were acquainted with the latest developments in the methods of hydrological and meteorological observations, new experimental techniques, etc.

and practical exercises were carried out in hydrology, topography, technical inspection of hydrologic stations, etc. *Subject Headings:* **1. Meteorological education 2. Hydrometeorological education 3. U.S.S.R.**—*I.L.D.*

11.1–71 551.5:378.4

Dési, F., **A meteorológus-képzés uj rendje.** [New system of meteorological training.] *Időjárás*, Budapest, 61(3):223–224, May/June **1957. DLC**—Starting with the academic year 1957/58 the meteorology curriculum of the Eötvös Lóránd University at Budapest will be extended from 8 to 10 semesters, the first 4 of which will be identical with those of the physics curriculum. Ten students will be allowed to register every other year. *Subject Headings:* **1. Meteorological curricula 2. Eötvös Lóránd Univ., Budapest.**—*G.T.*

11.1–72 551.5:378

Kurashima, A., **Izuchenie sovetskoĭ meteorologii v Iaponii.** [Study of Soviet meteorology in Japan.] *Meteorologiia i Gidrologiia*, Leningrad, No. 4:47–49, April **1958. DWB, DLC**—The interest of Japan in Russian meteorology begins with A. I. Voeĭkov's study of the bai-u. In the 1930's Masuyama introduced into Japan Kochin's work on atmospheric circulation and Shuleĭkin's theory on the monsoon. In 1943 H. Arakawa presented in his **Synoptic analysis** Multanovski's method of long range forecasting. After the war the German translation of Khromov's **Introduction to synoptic analysis** exerted considerable influence on meteorology in Japan. However, there is very little knowledge in Japan concerning Soviet work on numerical forecasting with electronic computers. Only since 1954 has the library of the Japanese Weather Central begun to receive regularly Soviet publications on meteorology and related fields. In order to more fully acquaint the Japanese with Soviet achievements in meteorology, the author began in 1956 to publish a series of historical articles on Russian and Soviet meteorology in the periodical **Sokko-Ziho.** Much of the content of these articles is based upon A. Kh. Khrgian's **History of Meteorology in Russia.** In 1958 a Society for the Study of Soviet Meteorology was organized with Tosha as head. *Subject Heading:* **1. Soviet meteorology influence in Japan.**—*I.L.D.*

HISTORY

11.1–73 551.593.62(09)

†Boyer, Carl Benjamin, **The rainbow: from myth to mathematics.** N. Y., Thomas Yoseloff, **1959.** 376 p., 68 figs., plates, tables, refs. by ch. p. 323–354. "Selected refs. . . . on history of the theory of the rainbow," p. 355–366. **DLC** (QC976.R2B68). Review by Robert P. Multhauf in *Science*, Wash., D. C., 131(3392):29, Jan. 1, **1960.**—A readable and yet informative and scholarly work on historical and scientific, as well as esthetic, aspects of the best known optical phenomenon in nature—the rainbow, with many photographic plates showing rainbows and portraits of the main contributors to the knowledge of the rainbow, schematic (geometrical) drawings of the optical principles involved, and photographic reproductions of early manuscripts relating to the subject, all carefully annotated. The eleven chapters cover: 1) prehistoric myths, 2) Greek and Roman theory and observation, 3) decline in early middle ages, 4) revival in the 12th–13th Century-Grosseteste (c. 1168–1253) and Bacon (1214–1292), 5) decline in the 15th Century, 6) 16th Century ideas of Maurolycus and Gilbert, 7) Kepler (1571–1630) and his explanation, 8) Descartes' (1596–1650) three new discoveries and ideas, 9) Newton's (1642–1727) theory and age, 10) Thomas Young's (1773–1820) wave theory 11) mathematical concepts of the 19th Century (1773–1829). *Subject Headings:* **1. Rainbow theories 2. History of optics.**—*M.R.*

11.1–74 551.593.62(09)

†Crombie, A. C., **Robert Grosseteste and the origins of experimental science, 1100–1700.** Oxford, Clarendon Press, **1953.** 369 p. 15 figs., numerous foot-refs., bibliog. p. 320–352. **DLC** (Q125.C685)—Ch. 9 and 10 (p. 232–289) of this remarkable work on history of experimental science, deals with the work of Robert Grosseteste (c. 1168–1253) and later writers on the theory of the rainbow and especially with experimental work of Theodoric (Dietrich) of Freiberg (died c. 1311), and on experimental method of rainbow color and light (14th 17th Century) as a classical example of the application of the experimental method in science.

Roger Bacon observed that the maximum alteration of the rainbow when the sun was on the horizon was 42°. Theodoric of Freiberg determined that the rainbow was due to both refraction and reflection inside the individual raindrops. He performed laboratory experiments with model hexagonal and spherical crystals, balls and flasks of water to show the refraction-reflection-refraction sequence of sunlight and correctly explained the order of colors in the primary and secondary rainbows. His elaborate drawings are reproduced and his sources carefully cited. *Subject Headings:* **1. History of science 2. History of optics 3. Rainbow theories 4. Grosseteste, Robert 5. Theodoric of Freiberg.**—*M.R.*

11.1–75 551.590.21:551.594.5(09)

Chapman, Sydney, (*High Altitude Obs., Boulder, Colo.*), **Solar influences on the upper atmosphere.** *Climax, Colo. High Altitude Observatory, Institute for Solar-Terrestrial Research, Technical Report,* No. 2:11–20, Oct. **1956.** 2 photos, 10 refs. **DWB?**—The history of the science of solar-terrestrial relations is reviewed with respect to the several fields of endeavor along those lines: auroras, geomagnetism, upper atmosphere ionization and chemistry and weather. It is emphasized that correlations with terrestrial phenomena are at best poor. Energy fluxes are given in a table. The fact that only a small beam of particles or rays affects the atmosphere over a portion of the earth for short periods is significant in accounting for poor weather conditions. *Subject Headings:* **1. Solar-terrestrial relationships 2. History of auroral research.**—*M.R.*

11.1–76 551.515.81

Rigby, Malcolm (*Ed., Met. Abstracts and Bibliography*), **Fortieth anniversary of the polar front theory (1918–1958).** *Weatherwise,* Boston, 11(3):78–103, June **1958.** photo, 7 refs. **DWB**—Brief note, accompanying a photograph of V. Bjerknes (1862–1951), describing the memorable milestone in the history of meteorology marked by J. Bjerknes' publication of **On the structure of moving cyclones** in November 1918, the importance of this cyclone model in synoptic analysis during the past 41 years, the development of the Bergen School from 1906–1948, and the refinements added to the first cyclone model in 1918–1919. *Subject Headings:* **1. Bjerknes cyclone model 2. Polar front theory anniversary. I. Bjerknes, V. II. Bjerknes, J.**—*M.R.*

11.1–77 551.501.9(09)(477)

†Dubinskiĭ, G. P., **Kratkaia istoriia meteorologicheskoĭ observatorii universiteta i organizatsiia seti meteostantsiĭ Khar'kovskoĭ gubernii.** [Short history of the meteorological observatory of the university and the organization of the network of meteorological stations in the Kharkov Province.] *Kharkov. Universitet, Uchenye Zapiski,* 56: (Vol. 2 of **Trudy** of its Geograficheskiĭ Fakul'tet) issued **1956.** p. 69–76. photos, 101 refs. **DLC** (AS262.K415)—V. I. Lapshin began meteorological observations in his garden in 1839, and at Kharkov Univ. in 1843. Except for a break in 1857–59, these observations have been continued uninterrupted to this day. Iu. I. Morozov carried on until 1891. N. D. Pil'chikov succeeded in establishing an observatory after years of fruitless attempts by his two predecessors to get support. In 1912 the observatory became one of those for international study of the upper atmosphere, and a world record low temp. of −75°C was recorded at 22 km here. In 1923 the astronomical and meteorological observatories were combined. Many special types of equipment (such as radiation, ice meters, etc.) are mentioned, and the development of the meteorological and climatological network for the Kharkov District outlined. Numerous works of the chief scientists at this observatory are cited and full page portraits of several of these men included. *Subject Headings:* **1. History of Kharkov Meteorological Observatory 2. Kharkov Univ. 3. Kharkov, Ukrainian S.S.R.**—*M.R.*

BIOGRAPHY

See also: **Contributions to the Rossby Memorial Volume** (Bolin, *ed.*), **11.1–1.**

11.1–78 551.5:92

Schaefer, Vincent J. (*Munitalp Foundation, Schenectady, N. Y.*), **Irving Langmuir, man of many interests.** *Science,* Wash., D. C., 127(3308):1227–1229, May 23, **1958.** photo.

DLC. Also: Bilancini, R., [**Obituary note on**] **Irving Langmuir.** *Rivista di Meteorologia Aeronautica*, Rome, 18(3):67, July/Sept. **1958. DLC**—Those interested in further details should read his biography and experiences in **Irving Langmuir, versatile scientist,** *Am. Met. Soc. Bull.*, 38:483, **1957** and **In Memoriam: Irving Langmuir—scientist,** *J. Colloid Sci.*, 13:3, **1958.** LANGMUIR died Aug. 16, 1957 after laying down concepts on broad national technical education and on the importance of presenting intellectual challenges to youngsters at an early age. He visualized the infinite opportunities in our modern times for the daring scientist. *Subject Headings:* **1. Obituary of Irving Langmuir 2. Langmuir, I.**—*N.N.*

11.1–79 551.5:92

Weickmann, L. (*Bad Kissingen*), [**Obituary of**] **Harald Ulrik Sverdrup 1888–1957.** *Meteorologische Rundschau*, Berlin, 11(3):73, May/June **1958. DWB, DLC.** Also: Shuleĭkin, V. V., [**Obituary of**] **Harald Ulrik Sverdrup.** *Akademiia Nauk, SSSR, Izvestiia, Ser. Geofiz.*, No. 9:1151–1152, Sept. **1958.** photo. **DLC.** Also: Ahlmann, H. W:son, [**Obituary of Harald Ulrich Sverdrup**]. *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 2:130–132, **1958.** 6 refs. **DWB, DLC.** Also: Bilancini, R., [**Obituary note on**] **Harald Ulrik Sverdrup.** *Rivista di Meteorologia Aeronautica*, Rome, 18(3):67, July/Sept. **1958. DLC**—The various obituaries discuss the academic and scientific career of H. U. SVERDRUP, who died on Aug. 21, 1957. A product and representative of the Bjerknes school, SVERDRUP made numerous important contributions to the fields of oceanography and meteorology, serving as director of the Scripps Oceanographic Institute and the Norwegian Polar Institute. His role in many scientific expeditions as an explorer and his invaluable work as a teacher are also eulogized. *Subject Headings:* **1. Obituary of H. U. Sverdrup 2. Sverdrup, H. U.**—*I.L.D., M.R.*

11.1–80 551.5:92

Koschmieder, H., [**Biographical sketch of Heinrich von Ficker, Nov. 22, 1881–April 29, 1957**]. *Beiträge zur Physik der Atmosphäre*, Frankfurt a.M., 31(3/4):141–146, **1959.** photo. **DWB, DLC.** Also: Weickmann, L., [**Obituary of**] **Heinrich Ficker.** *Meteorologische Rundschau*, 10(3):81, May/June, **1957. DWB.** *Also:* Ertel, Hans, [**In memoriam**] **Heinrich Ficker.** *Zeitschrift für Meteorologie*, Berlin, 12(4/6):99, April/June **1958. DWB, DLC.** *Also:* Khromov, S. P., **Genrik Fikker (k godovshchine so dnia smerti).** [Heinrich Ficker: anniversary of his death.] *Vsesouiznoe Geograficheskoe Obshchestvo, Leningrad, Izvestiia*, 90(4):356–357, **1958. DLC**—KOSCHMIEDER gives a long account of the eventful life of H. VON FICKER, born in Munich, Nov. 22, 1881, died in Vienna, April 29, 1957. FICKER's early föhn studies (1905–25) are considered today to be definitive, as they were based on aerological and free balloon ascents, as well as on theory and observation. He is said to be the first to use the term "air mass" in the current sense of the word (1906). His works on spreading of cold and warm air over Eurasia (1910–11) are also classical, and almost paralleled BJERKNES' development of the polar front theory. Other famous works are cited. His experiences in a Russian prison in Turkistan during World War I, and his residence for 2 years in Kazan where he became acquainted with Russia and Russian life and scientists are mentioned. He was offered the directorship of the Russian Hydrometeorological Service in 1925 but refused it. He was director of the Zentralanstalt für Meteorologie und Geodynamik in Vienna from 1937–1952, and from 1947–51 was President of the Vienna Academy of Science. *Subject Headings:* **1. Obituary of Heinrich Ficker 2. Ficker, Heinrich von.**—*M.R.*

BIBLIOGRAPHY

See also: **WMO Bibliography and Publications Commission,** 11.1-45; bibliog. of **Reference Works of Past Decade,** p. 101.

11.1–81 551.525.5:016 551.578.4:016

†U. S. Snow, Ice and Permafrost Research Establishment, **Bibliography on snow, ice and permafrost, with abstracts,** Vol. 12, 13 and Vol. 14, Jan. **1958,** Jan. **1959** and Jan. **1960.** Vol. 12, 236 p. Items 15001–16000. Vol. 13, 234 p. Items 16001–17000. Vol. 14, 249 p. Items

17001–18000. (Its *SIPRE Report*, No. 12, Vol. 12, 13 and 14) "Formerly published semi-annually. Beginning Vol. 12, issued annually." (*See* 8G–211, July 1957, *MAB*, for abstract on Vol. 1–11.) **DLC**—Each volume contains 1000 informative abstracts plus an author and subject index, and a list of libraries where the material is to be found. A high percentage of the material is from Russian sources. *Subject Headings:* **1. Snow, ice and permafrost bibliographies. I. U. S. Library of Congress II. Hughes, Thomas E.** (*ed.*).—*M.R.*

11.1–82 551.5:061.1(73):016

†U. S. Weather Bureau, **Index of information published on the back of the Daily Weather Map.** On the back of its *Daily Weather Map*, Aug. 9, **1956.** **DWB**—About 100 graphically illustrated articles on various meteorological subjects or activities of the Weather Bureau and its many special services, are listed, with the corresponding date of the last weather map on which each was published. The subjects are listed alphabetically and are arranged under the major headings of: 1) Agriculture, 2) Aviation, 3) Climatology, 4) Cooperation, 5) Forecasting, 6) Hurricanes, 7) Industrial Meteorology, 8) Instruments, 9) Operations, 10) Recreation, 11) River Services, 12) Tornadoes and 13) Transporation (*see* Pt. 3, p. 408, May 1951, *MAB*). *Subject Headings:* **1. U. S. Weather Bureau services 2. Weather map back articles 3. Bibliography of weather map back articles.**—*M.R.*

11.1–83 551.5:63:016

†Germany. Deutscher Wetterdienst, **Agrarmeteorologische Bibliographie** [Agricultural meteorology bibliography], **1957.** Its *Bibliographien*, No. 9, pub. **1959.** Comp. by Max Schneider. 92 p. 661 titles, many with abstracts. (For abstract on 1950 issue, *see* 6.11–50, Nov. 1955; for 1951 and 1952 issues, *see* 7.11–58, Nov. 1956; for 1956 issue, *see* 9.11–71, Nov. 1958, *MAB*.) **DWB**—Continuation of series of systematically arranged bibliographies covering the entire range of interests of the agricultural meteorologist or climatologist. Many of the abstracts are quite lengthy and informative, but at least half of the items listed have no annotation. The subject breakdown is quite detailed, there being 100 categories grouped by a decimal system under 8 major headings: 1) general; 2) local, micro and stand climate; 3) atmospheric conditions and soil (ground); 4) atmospheric conditions and plants; 5) atmospheric conditions and agricultural crops, practices, etc.; 6) atmospheric conditions and plant diseases and pests; 7) atmospheric conditions and animals; and 8) research methods and instruments. An author index and list of periodicals or serials used as sources is included. One such bibliography has been issued for each year 1950–57, inclusive. *Subject Headings:* **1. Agrometeorology bibliographies. I. Schneider, Max** (*comp.*).—*M.R.*

11.1–84 551.574.41:016:581.14

†Stone, Edward C. (*School of Forestry, Univ. of Calif.*), **Dew as an ecological factor, Pt. 1, A review of the literature.** *Ecology*, Durham, N. Carolina, 38(3):407–413, July **1957.** bibliog., p. 412–413. **Pt. 2, The effect of artificial dew on the survival of *Pinus ponderosa* and associated species,** p. 414–422. **DWB**—Extensive literature (from 1727 to 1956) on dew as an aid to plant survival is reviewed chronologically and experiments conducted by the authors and their colleagues on use of artificial dew to prolong life of *Pinus ponderosa*, *Pinus jeffreyi* and *Abies concolor* seedlings, reported in detail. Different soils (sandy, loam and clay) were tested and conclusion reached that dew extended life of *Pinus ponderosa* 30 days, *Abies concolor* 20 days and *Libocedrus decurrens* 72 days. *Pinus jeffreyi* was not responsive. *Subject Headings:* **1. Artificial dew 2. Dew effects on plant survival 3. Dew bibliographies.**—*M.R.*

11.1–85 551.579:016

†International Union of Geodesy and Geophysics. Association of Scientific Hydrology, [**International Bibliography of Hydrology**]. **Hydrologische Bibliographie Deutschland,** [Hydrological Bibliography of Germany], **1955,** issued Koblenz, **1958.** 202 p. 758 entries (some duplicated under several subject groups). Includes additional titles from 1952–1954 imprints. 9 subject groups. Author index. (For abstract on 1952–1954 issues, *see* 9.3–64, March 1958; for 1936–1950 issues, *see* 6A–85, Jan. 1955; for 1951 issue, *see* 7.5–33, May 1956,

(*MAB.*) **DWB, DLC**—Outline follows same arrangement as the 1952 and 1953 issues: I. Hydrometeorology (rain, snow, evaporation and humidity); II. Water courses (channel processes, runoff, sediments, physics, chemistry, biology, hygiene, ice); III. Lakes (formation, measurement of surface and underground in and outflow, physics, chemistry, biology, hygiene); IV. Glaciers (types and formation, measurement, condition); V. Ground water and springs; VI. Water balance; VII. Application of statistics, etc. to hydrology; VIII. General works; IX. Miscellaneous. *Subject Headings:* **1. Hydrology bibliographies 2. Germany. I. Germany. Bundesanstalt für Gewässerkunde, Koblenz II. Friedrich, W. III. Schroeder, G.** —*M.R.*

11.1–86 551.579:016

†International Union of Geodesy and Geophysics. Association of Scientific Hydrology, **[International Bibliography of Hydrology]. Hydrologická Bibliografie, Československo,** [Hydrological bibliography of Czechoslovakia], Vol. 10, **1956,** issued Prague, **1958.** 219 p. 579 entries under 10 subject groups (some annotated). All titles as well as foreword and table of contents in Czech, Russian, English and German. "Last issue of the Bibliography, Vol. 9, covered 1942, printed 1945." **DWB**—The international arrangement has been followed in general: I. Hydrometeorology; II. Water courses (morphology, movement of water, runoff, bedload and suspension, winter regime, physics, chemistry and biology, hygiene and technology); III. Lakes and ponds; IV. Glaciers; V. Ground water and springs; VI. Water balance; VIII. Water conservation in agriculture and forestry (irrigation, drainage); IX. Municipal and industrial water use; X. General; XI. Miscellaneous. Annotations are brief. Section VII is wanting. *Subject Headings:* **1. Hydrology bibliographies 2. Czechoslovakia. I. Prague. Vyzkumný Ústav Vodohospodárský.**—*M.R.*

GLOSSARIES

See also: Bibliog. of **Reference Works of Past Decade,** p. 101.

11.1–87 551.5(030.8)

Mamontova, Lydia I. and Khromov, S. P., **Anglo-russkiĭ meteorologicheskiĭ slovar'.** [English-Russian meteorological glossary.] Leningrad, Gidrometeoizdat, **1959.** 172 p. **DLC** (QC854.M3)—An excellent compilation of about 12,000 English terms used in meteorological literature, and their equivalents in Russian. Both specific meteorological terms, and terms used in physics, statistics, geography, mathematics, and related fields, as well as some general terms are included. Phrases are usually listed under the first word of the phrase (e.g., potential temperature is under potential), plurals and other grammatical forms are sometimes given (e.g., aurora, auroras) where not obvious, multiple meanings are distinguished from synonymous equivalents and a number of other refinements are incorporated to make the glossary useful for translation. A few errors are noted, but many of these have been corrected by the author in some copies. Many new terms have been included; many more will be added in another edition. No definitions are given. *Subject Headings:* **1. English-Russian meteorological glossaries 2. Russian language glossaries 3. Meteorological glossaries.**—*M.R.*

111.–88 551.326:001.4(030.8)

Mandrovsky, Boris N. (*comp.*), **Russian-English glossary and Soviet classification of ice found at sea.** Wash., D. C., Reference Dept., Library of Congress, **1959.** 30 p. 5 refs. Price: $.30. **DLC** (Z663.2.R825)—The Soviet Sea Ice Classification system (Decimal system) is given in detail on p. 1–9 with American equivalents followed by alphabetical (in Russian) Cyrillic listings of 206 terms relating to sea ice, iceberg and related phenomena, and the transliterated and American equivalents and, in some cases, the WMO equivalents used in IGY. The glossary was prepared by coordinating Soviet ice terms from their album of **Ice formations on seas,** with the Hydrographic Office **Glossary of ice terminology,** the WMO abridged **International ice nomenclature,** and the Scott Polar Research Institute **Illustrated ice glossary.** *Subject Headings:* **1. Russian-English ice glossaries 2. Sea ice glossaries 3. Russian language glossaries 4. Sea ice classification. I. U. S. Library of Congress. Reference Dept.**—*M.R.*

11.1–89 551.5(030.8)

Anglo-russkiĭ meteorologicheskiĭ slovar'. [English-Russian meteorological glossary.] Moscow, Gosud. Izdatvo Fisiko-Matematicheskoĭ Lit-ry, **1959.** 244 p. Russian language index to glossary, p. 176–244. Price: $1.50.—A useful compilation of about 7,000 terms related directly or indirectly to general, synoptic dynamics and physical meteorology and climatology, and pertinent physics terms from statistics, geography, physics, etc. Words or phrases are listed alphabetically, with considerable inversion of terms so that the arrangement is classificatory (e.g. under *gradient* there are 11 terms with adjectives preceding the word *gradient*, and 28 under *pressure*). An index lists the terms in Russian (Cyrillic alphabet) with reference to the page and column where the English word (with Russian equivalent) will be found. This dictionary was compiled by professional philologists (with a geographer as advisor), rather than by meteorologists, as was the recent glossary of MAMONTOVA and KHROMOV (*see* 11.1–87, Jan. 1960, *MAB*), so it is not as authoritative. However, the Russian language index makes the work more than doubly useful and more than compensates for the scores of obsolete, unnecessary rarely, if ever used, or erroneous English terms found throughout the book. Appended are lists of standard abbreviations (e.g., *E.S.T.*, *s.d.*). Equivalents for isarithm terms (many never used) such as *isoabnormal* (isanomal), *isoaurore* (isochasm), *isodense* (isopyenic) or *isophenological line* (isophane). Another appendix gives international code terms (e.g., CLIMAT), cloud types and forms, geographical abbreviations and international symbols with their definitions. Naturally, there are many important terms which are omitted, both in the main listing and in the appended lists of abbreviations and isolines. Evidently, the English terms were obtained from available translations, many of which were made by translators unfamiliar with English idiom. On the other hand a large number of terms are included which are strictly idiomatic. *Subject Headings:* **1. English-Russian meteorological glossaries 2. Russian-English meteorological Glossaries 3. Meteorological glossaries. I. Ainbinder, M. I.** (*comp.*) **II. Allenova, N. M.** (*comp.*) **III. Gall, N. A.** (*comp.*) **IV. Savina, L. V. V. Astapenko, P. D.** (*ed.*).—*M.R.*

11.1–90 550.3(030.8)

Nemetsko-russkiĭ geofizicheskiĭ slovar'. [German-Russian geophysical glossary.] Compiled by G. B. Vil'kovyskaia; I. I. Muronets and S. V. Puchkov. Ed. by I. M. Kravchenko and A. I. Simonov. Moscow, Gosud. Izdatvo Fiziko-Matematicheskoĭ Lit-y., **1959.** 409 p.—Nicely bound glossary (5000 copies) containing about 20,000 terms in meteorology, climatology, oceanography, hydrology, glaciology, seismology, ionosphere, geomagnetism, lat. and long. (all IGY disciplines), with Russian term or terms following each alphabetically arranged German term. The semiclassificatory system is used (i.e., many terms relating to tides, currents, etc. are listed under these respective terms even if an adjective precedes the main term). Languages of origin of terms are given for local winds. The work seems to be quite complete and accurate for the broad field of geophysics but lacks a Russian index. *Subject Headings:* **1. Geophysical glossaries 2. German-Russian geophysical glossaries. I. Vil'kovyskaia, G. B.** (*comp.*) **II. Muronets, I. I.** (*comp.*) **III. Puchkov, S. V.** (*comp.*) **IV. Kravchenko, I. M.** (*ed.*) **V. Simonov, A. I.** (*ed.*).—*M.R.*

11.1–91 5(030.8)

†Gaynor, Frank, **Concise dictionary of science: physics, mathematics, nucleonics, astronomy, chemistry.** N. Y., Philosophical Library, **1959.** 546 p. List of publications (39) from which copyrighted material was used in the dictionary. Price: $10.00. Review by J. E. McDonald in *American Meteorological Society, Bulletin*, 41(2):92, Feb. **1960.**—Over 6000 terms used in popular science or technological literature, especially in that concerned with astronautics, atomic energy or aviation are defined simply and briefly, although a few of the terms are more fully defined. Probably 200 or 300 terms relate to meteorology or physics of the atmosphere, over 1000 to physics (also applicable to meteorology), and the same number to astrophysics. Although meteorological terms are too briefly defined to suit a meteorologist, the definitions of terms in borderline fields are adequate for a meteorologist, and these are the terms for which he is most interested in finding some sort of a definition. *Subject Heading:* **1. Technical dictionaries.**—*M.R.*

PRACTICAL AND APPLIED METEOROLOGY

OCEANOGRAPHY AND MARINE METEOROLOGY

See also: **Atmos. and sea in motion** (Bolin, *ed.*), 11.1–1; **Oceanographic expeditionary data,** 11.1–8; **Marine climate** (Shibata), 11.1–16; **Submarine acoustics** (Officer), 11.1–18; **Marine biology** (Walford), 11.1–20; **Climatic data, Netherlands lightships** (Verploegh), 11.1–31; **Symposium on Deep-Sea Research,** 11.1–68; **Storm surges, Great Lakes** (Donn), 11.1 210; **Storm surges, North Sea** (Rossiter), 11.1–211; **Yachting weather, Cowes** (Francis), 11.1–235.

11.1–92 551.46(267)

Muromtsev, A. M., **Okeanograficheskaia izuchennost' Indiĭskogo Okeana.** [The state of knowledge of the oceanography of the Indian Ocean.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:14–18, June **1958.** fig., ref. **DWB, DLC**—The history of oceanographic observations in the Indian Ocean since those of James Cook in 1772, up to the present, and the type of observations and extent of area investigated, are summarized. In regard to the quality, existing oceanographic data for the Indian Ocean are inferior to those for the Pacific and Atlantic. But in contrast to these two oceans for which observations are limited almost entirely to the northern regions, the observations for the Indian Ocean are distributed more evenly. The distribution of deep water observations in the Indian Ocean is shown on a map indicating the number of observations and elements observed since 1873 in each 10° square. The distribution of deep water temperatures is more uniform than in the Pacific. Also the seasonal distribution of observations is more evenly distributed. Deep water observations are fewer than surface water observations. Satisfactory maps of mean monthly temperature of the ocean surface are available. Maps on the distribution of salinity during the winter (Northern Hemisphere) for the entire surface and for the summer (Northern Hemisphere) north of 20° south latitude, have been constructed so that in respect to salinity and density the Indian Ocean is better investigated than the Pacific. Existing deep water data provide adequate information on the horizontal distribution of temperature, salinity and density at all levels from 10 m to the bottom. These data, together with those for oxygen, provide indirect information on the circulation of the water at different levels. No information is available on the annual variation of the hydrological elements at different depths. Necessary oceanographic observations in the Indian Ocean are discussed. *Subject Headings:* **1. Oceanographic observation 2. Indian Ocean.**—*I.L.D.*

11.1–93 551.462:551.3.051(261.3)

Ignatius, Heikki, **On the rate of sedimentation in the Baltic Sea.** *Suomen Geologinen Seura, (Comptes Rendus)*, No. 30, **1958.** Reprinted from *Finland. Geologiska Kommission, Bulletin*, No. 180:135–144, **1958.** 2 figs., 24 refs. Summary p. 135. **DLC** (QE276.3.A6)—This paper is essentially a part of a lecture, dealing with the working methods and preliminary results of current Finnish marine geological studies, delivered before the Baltic Sea Committee on May 21, 1957, in Stockholm. Stratigraphic sequences obtained by piston coring from the deep basins of the Baltic Sea have revealed a striking upward decreasing rate of sedimentation: in general the amount of annual deposition has dropped from a few or even scores of cm to 0.2–2 mm. This is considered to be a result of the normal succession from late-glacial to post-glacial sedimentary conditions. *Subject Headings:* **1. Sedimentation rate 2. Baltic Sea.**—*Author's abstract.*

11.1–94 551.465

Fel'zenbaum, A. I., **Metod polnykh potokov v teorii techeniĭ melkogo moria.** [Method of "complete currents" in the theory of flow of a shallow sea.] *Meteorologiia i Gidrologiia*, Moscow, No. 3:16–22, May/June **1955.** 3 figs., 4 refs., 18 eqs. **DWB**—Theoretical computation of currents in a shallow sea has been greatly facilitated since N. A. Bagrov's observations and theoretical computations showing that under effect of a stable wind the whole current of a shallow sea, from top to bottom, reaches a homogeneous settled condition in 2–3 hrs. Proceeding from the above, the author uses the method of "complete currents" for computing

the horizontal circulation in the northern part of the Caspian Sea. He determines the function of "complete currents" ψ by a numerical integration of Poisson's equations according to the grid method. *Subject Headings:* **1. Sea currents 2. Shallow water waves.**—*A.M.P.*

11.1–95 551.46:532.5:551.511

Boguslavskiĭ, S. G., **Zavisimost' koeffitsienta turbulentnosti ot parametrov morskikh voln.** [Dependence of the turbulence coefficient on the sea wave parameters.] *Akademiia Nauk SSSR, Doklady*, n.s., 115(3):494–496, July **1957.** fig., table, 4 refs., 5 eqs. **DWB**—Vertical turbulent exchange in the ocean is treated theoretically as a function of wind speed and of the wave parameters. An empirical curve illustrating the relation of turbulence coefficient to wind speed is presented. *Subject Headings:* **1. Turbulent exchange coefficients 2. Turbulent exchange in sea 3. Vertical turbulent exchange.**—*G.T.*

11.1–96 551.462:778.53

Laughton, A. S. (*Natl. Inst. of Oceanog., Wormley, Eng.*), **Photography of the deep-sea floor.** *Discovery*, London, 18(2):59–62, **1957.** 7 figs. **DLC.** Reprinted in *National Institute of Oceanography, Wormley, England, Collected Reprints*, Vol. 5, No. 185, **1957.**—During the last decade, we have seen an enormous increase in the popularity of underwater activities stimulated by the skin-diving techniques that have opened up a new world to anyone prepared to don mask and "flippers." Hand in hand with this, the skill in underwater photography has revealed many fascinating glimpses into this new world. What is not so well known is the photographic exploration of the deep oceans, where only a very few men have ever descended, a world that is as different from the shallow margins of the continent as they in turn are from the land. The first successful attempts at photographing the deep were made in America during the last war and many improvements have since been made. Now in England, at the National Institute of Oceanography, a new deep sea camera has been made and during the summer of 1956 many photographs of special features of the deep sea were taken from the research ship R.R.S. "Discovery II." *Subject Headings:* **1. Deep sea underwater cameras 2. Ocean floor photography.**—*Author's abstract.*

11.1–97 551.46.018:656.6

Tucker, M. J., (*Natl. Inst. of Oceanog., Wormley, Eng.*), **Shipborne wave recorder.** *Conference on Coastal Engineering Instruments, First, Berkeley, Calif., Oct. 31–Nov. 2, 1955, Proceedings*, pub. **1956.** p. 112–118. 5 figs., 2 refs.—Different article of same title appeared in *Institution of Naval Architects, Transactions*, 98:236–250, **1956.** 10 figs., 14 refs., 5 eqs. Appendix: Cartwright, D. E., **The use of the shipborne wave recorder for studying ship motions at sea,** p. 245–246. Both articles by Tucker (and appendix) appeared in *National Institute of Oceanography, Wormley, England, Collected Reprints*, Vol. 5, No. 165 and 167, **1957. DWB**—The instrument described measures waves from a ship which may be in deep water. It combines measurements of the sea pressure at a point on the ship's hull with the vertical displacement of this point. No equipment was to be put outboard, and a wave record is obtained merely by switching on the main switch. An instrument has been in routine use in an Ocean Weather Ship for nearly three years, during which time some thousands of records have been taken. Designed originally for wave research, the instrument is also finding application in ship-motion studies. Its main limitation is its inability to measure waves with periods of less than about 4 seconds. A note by D. E. CARTWRIGHT describing a method of applying the wave recorder to the study of ship motion is included. *Subject Headings:* **1. Shipborne wave recorders 2. Ship motion studies 3. Wave pressure measuring device.**—*Author's abstracts.*

11.1–98 551.515.1/2:532.593:551.465

Munk, W. H. and Snodgrass, F. E., **Measurements of southern swell at Guadalupe Islands** *Deep-Sea Research*, London, 4(4):272–286, **1957.** 10 figs., 13 refs., 9+15 eqs. **DLC**—We have obtained some energy spectra of pressure fluctuations on the sea bottom at a depth of 60 fathoms off Guadalupe Island, Mexico. The spectra consist of peaks whose frequency increases by about 10% per day; sequences repeat once every three or four days. The waves

ome from the southwest quarter, and the distance of generation is estimated at 8000 naut mi. he signals are attributed to cyclones in the storm belt of the Southern Hemisphere. The irliest arrivals are of the order of 1 mm high and 1 km long. They may have originated in he Indian Ocean and passed just east of New Zealand, or to the west through the Tasman Sea. ater arrivals were generated in the South Pacific. Measurements taken at many other casions at various localities in the northeast Pacific indicate that this radiation from the outhern Hemisphere is present at all seasons. Apparently it constitutes the principal back- round in the ocean wave spectrum for the low frequencies under consideration. *Subject eadings:* **1. Swell from distant cyclones 2. Guadalupe Island, Mexico.**—*Author's abstract.*

11.1–99 551.510.71:551.464(261,268)

Fonselius, Stig (*Internat. Met. Inst., Stockholm*) and östlund, Göte (*Geological Survey of weden*), **Natural radiocarbon measurements on surface water from the North Atlantic and the rctic Sea.** *Tellus*, Stockholm, 11(1):77–82, Feb. **1959.** fig., 3 tables, 10 refs., 4 eqs. **DLC**— n apparatus for the extraction of carbon dioxide from 100 liters of sea-water using carbonate- ee sodium hydroxide solution as absorbant liquid and its performance is described. A test eries of 6 sea water samples is presented, on which natural C14 determinations are made and ie results obtained are briefly discussed in relation to other age measurements on similar aters. The correlation between salinity and C14 activity is shown. *Subject Headings:* **. Radiocarbon in the ocean 2. Radiocarbon measurement techniques 3. North Atlantic Arctic Ocean.**—*Authors' abstract.*

GLACIER ICE AND SEA ICE

See also: **Glaciers, Central Asia** (Murzaev), 11.1–9; 11.1–10; **Forecasting the freezing of rivers** (Makarevich), 11.1–24; **IGY glaciological program** (Grave), 11.1–43; **Pressure gradient near edge of ice sheet** (Hamilton), 11.1–49; **Military climat , Greenland Ice Cap** (Frost), 11.1–52; **Russian-Eng ice glossaries** (Mandrovsky), 11.1–88; **Accretion and ablation-Fröya Glacier** (Ahlmann), 11.1–266; **Patagonian ice field climate** (Schwerdtfeger), 11.1–282; **Ice Age theories** (Schell), 11.1–283; **The Near East during the last glaciation** (Butzer), 11.1–285.

11.1–100 551.324.41(99)

Schoeck, Peter A. (*Univ. Minnesota*), **Glaciers and climate: nature's heat and mass ansfer problem.** *Heating, Piping and Air Conditioning*, 30(5):185–186, May **1958. DWB**— eneral facts on glaciers of the world, heat budget of glaciers, general ablation in excess of ccumulation during past century, especially in Arctic and causes of this retreat (increase of ieridional exchange and earlier melting of snow in spring, resulting in greater absorption of olar energy is given as likely mechanism). Also increased cloudiness due to longer atmospheric irculation produces a greenhouse effect. Antarctic conditions differ considerably from those n the Arctic, owing to negative radiative heat balance, minimum melting and small evaporative osses. Only advective heat gain, or increased accumulation due to increased meridional xchange (precip.) would alter the present state of equilibrium on Antarctic continent. *Subject eadings:* **1. Glacier variations 2. Heat budget of glaciers 3. Antarctic ice.**—*M.R.*

11.1–101 551.324.6(83)

Lliboutry, L. (*Grenoble Univ.*); Gonzalez, O. and Simken, J. (*both Centro de Glaciologia, Iniv. de Chile*), **Les glaciers du désert Chilien.** [Glaciers in the Chilean desert.] *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 957, [Transactions]*, Vol. 4, pub. **1958.** p. 291–300. 3 figs., 12 refs. **DWB, DLC**—During ast few years Chilean climbers have discovered some small glaciers on the highest summits f northern Chile, in spite of the utmost aridity of this region. In particular at the Llullaillaco 24°43′ lat. S, 6723 m) there is a sheet of ice on the western side between 6500 and 5600 m; t the Ojos del Salado (27°07′ lat. S, 6885 m) two glaciers lie on the northwestern slope, one etween 6600 and 6100 m, the other one in the prolongation of the first between 5800 and 5400 ; at the Tortolas (29°56′ lat. S, 6323 m) a glacier spreads all over the southeastern side etween the top and 5600 m; etc. The direction of the prevailing wind and the exposure of

these glaciers varies from one mountain to another. Precipitation, of a stormy character i summer, seems to be originated by up-slope katabatic winds. In summer, the air temperatur at 6500 m sinks during the night to −28°C; at 5300 m it is never above 0°C. Neverthele snow melts readily when the sun strikes between the penitents. It forms small streams of wate as well as overglacial lakes with frozen surfaces. These lakes take the place of a water-soake neve, without formation at any time of a free water-surface. These glaciers have neithe moraines, nor crevasses, nor any sign of movement. They are for their whole area eithe accumulators or ablators, depending on the year. They have not receded appreciably durin the last 20 years. To this extent they resemble, somewhat, in their behavior some regions of th Antarctic. *Subject Headings:* **1. Glaciers, Chilean desert 2. Chile.**—*Authors' abstract.*

11.1–102 551.324.88

Meier, Mark F. (*U. S. Geological Survey, Tacoma, Wash.*), **The mechanics of crevass formation.** *International Union of Geodesy and Geophysics. Association of Scientific Hy drology, Toronto, Sept. 1957,* [*Transactions*], Vol. 4, pub. **1958.** p. 500–508. 7 figs., table 9 refs., 5 eqs. **DWB, DLC**—Crevasses are of fundamental importance to an understandin of glacier flow and of fracture patterns in deforming solids. Crevasse patterns on a temperat valley glacier (Saskatchewan Glacier, Canada) were studied as part of a general investigatio of the mode of flow of that glacier, and a simple crevasse pattern in the North Greenlan Icecap was selected for further work. Preliminary results show that crevasse formation i preceded by a build-up in extension rate. Crevasses then form so as to relieve the extensio rate on intercrevasse blocks. In a plan view, principal strain rate axes are not exactly per pendicular or parallel to the crevasse. Intense deformation in pure shear precedes an ex tending crevasse. The crevasses studied opened as rigid wedges in a vertical cross sectio and the jerkiness of opening decreased rapidly with depth. Some interpretations are suggested The initiation of crevasses appears to be determined by the curvature of the snow surface an the rate of accumulation or ablation. Relations between spacing and depth of crevasses an prevailing extension rates are given. These relations allow prediction of velocity in area where direct measurements are impossible. Depths of crevasses can be computed and these results agree well with observation. *Subject Headings:* **1. Glacier movement 2. Crevasse formation.**—*Author's abstract.*

11.1–103 551.324.5(798)

†Miller, Maynard M. (*Lamont Geological Obs., Columbia Univ.*), **Phenomena associated with the deformation of a glacier bore-hole.** *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 1957,* [*Transactions*], Vol. 4, pub. **1958** p. 437–452. 7 figs., 2 tables, 17 refs. **DWB, DLC**—A stress/strain analysis is made of the deformation of a 2-in. (I.D.), 245-ft length of jointed aluminum tubing inserted in a vertica bore-hole in the Taku Glacier of the Juneau Icefield, Alaska. The data embrace three years of consecutive measurement of the changes in azimuth and inclination of the tube in respons to flow equations, as derived from laboratory tests on polycrystalline ice, and are compare with bore-hole and tunnel experiments conducted in glaciers of the Alps and Norway. The total depth of ice is known by seismic means. Although the tube penetrates only the uppe one-quarter of the Taku Glacier, it is demonstrated that the periodic surveys permit a reason able extrapolation of the differential flow velocity on a vertical line completely through th glacier. It is shown that with the internal movement dominated by continuous plastic creep a supplemental longitudinal stress trajectory has been superimposed on the normal shea component of flow. In consequence, the low-gradient sectors of the glacier are characterize by a high proportion of basal slippage. This concept is corroborated by the "Block-Schollen" surface velocity profiles and by the existence of tectonic foliation and thrust structures in narrow zone of discontinuous movement near the glacier's margin. Certain anomalies in th bore-hole deformation (creep rate) are explained by configuration of the bedrock floor, and b measured physical differences in the structure of the glacier itself. Observed thermal anomalie on the profile are also considered. These are found to coincide with deformation anomalie and to indicate that zones of inhibited flow occur where colder englacial temperatures prevail *Subject Headings:* **1. Glacier investigations 2. Glacier mechanics 3. Taku Glacier, Alaska.** *Author's abstract.*

11.1–104 551.324.5/.6

Schimpp, O., **Der Eishaushalt am Hintereisferner in den Jahren 1952–53 und 1953–54.** [Ice economy of Hintereis Glacier in 1952–53 and 1953–54.] *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 1957,* [*Transactions*], Vol. 4, pub. **1958.** p. 301–314. 6 figs., 15 refs. **DWB, DLC**—Measurements on 54 gages give dates of the seasonal fluctuations of the glacier movement. The vertical component of the movement was especially determined. The length of the tongue of the Hintereis Glacier does not correspond to the alimentation in the firn area, but is an indication of a passed glacier position. The vertical movement, along with annual accumulation and ablation data, gives a new solution to calculations of the glacier economy separated for alimentation- and ablation-area. This shows the real relations between alimentation and economy. *Subject Headings:* **Glacier movement 2. Glacier fluctuations.**—*Author's abstract.*

11.1–105 551.324.63:551.583.3

†Rukhin, L. B., **Problema proiskhozhdeniia materikovykh oledenenii.** [Problem of the origin of continental glaciations.] *Vsesouiznoe Geograficheskoe Obshchestvo, Leningrad, Izstiia,* Vol. 90(1):25–38, Jan./Feb. **1958.** 3 figs., 27 refs. **DLC**—Available information indicates that the last two glaciations—the Quaternary and the Upper Paleozoic—are principally the result of a complex of physical geographic conditions arising on the earth's surface and their explanation does not require astronomical causes. The Quaternary glaciation in the Northern Hemisphere is explained by (1) the rapid displacement of the North Pole by 40–50° at the end of the Tertiary period into a circumpolar basin isolated from the open ocean by the uplift of the Thompson ridge and perhaps also by the Nansen barrier both of which occurred in the early Quaternary, and (2) the presence of the Gulf Stream and its accompanying mass of warm air which results in frontal activity at the boundaries of the frozen circumpolar basin. The evidence for the Upper Paleozoic glaciation in South America (Argentina, southern Brazil), southern and central Africa, India and Australia is summarized, and it indicates that glaciation began earliest in South America and Australia. A Middle Carboniferous glaciation was present also in southern Africa. The glaciation attained its maximum extension in the Upper Carboniferous when glaciation appeared also in India. The principal centers of glaciation were southern Argentina, eastern Brazil, southern Africa and Australia. In the Paleozoic the South Pole was situated in southern Africa and the equator passed through northern India. Hence the Upper Paleozoic glaciation was concentrated in the Southern Hemisphere. The Gondiva basin, which was isolated from the open ocean and within whose center the South Pole was situated, cooled and on freezing became transformed into an intense cold source. When moist air masses appeared at the peripheral zones of this basin, large accumulations of snow and thin ice were formed. Finally, arguments are presented showing that the Wegener hypothesis of the floating of the continents cannot explain the Gondiva glaciation; that changes in amount of solar heat owing to variations in the slope of the ecliptic, eccentricity of the earth's orbit and position of its perihelion are not sufficient to explain climatic phenomena on the earth; and that mountain formation is not the cause of the glaciations. *Subject Headings:* **1. Quaternary glaciation 2. Upper Paleozoic glaciation 3. Ice age theories.**—*I.L.D.*

11.1–106 551.324:912

Field, William O. et al., **Atlas of mountain glaciers in the Northern Hemisphere.** *U. S. Quartermaster Research and Development Center. Environmental Protection Research Div., Technical Report,* EP-92, June **1958.** vi p.+48 maps (part fold.). Contract DA 19-129-QM-1159 with American Geographical Society. This is Pt. 10 of the complete contract report **Geographic study of mountain glaciation in the Northern Hemisphere** (table of contents included here in Appendix). **DWB** (M86 U585t)—The areal distribution of mountain glaciers in the Northern Hemisphere is shown in 48 maps. The large glaciers, geographical features, political features, and elevations of peaks are identified. Insert maps are added where more definition is desirable, showing additional features such as highways, railways and villages. *Subject Headings:* **1. Mountain glacier atlases 2. Mountain glaciation 3. Glaciers, Northern Hemisphere 4. Northern Hemisphere.**—*SIPRE abstract,* 17177.

ASTRONAUTICS-SATELLITE OBSERVATORIES

See also: **Satellite obs., 11.1–2.**

11.1–107 551.507.362.2:629.11

Abbott, W. N., **Optical earth satellite observations.** Alaska. Univ. Geophysical Institute, Contract AF 30(635)-2887, Scientific Report No. 2, Feb. 14, **1958.** 15 p. 4 figs 2 tables, eqs. **DWB** (629.1388 A323sco)—The earlier orbits and ephemerides for the Soviet satellites were not sufficiently accurate to be very useful in making observations in Alaska. Extrapolations from our own observations gave better predictions. This merely pointed out the fact that rough observations of meridian transits at high latitudes will give better values of the inclination of the orbit than precision observations at low latitudes. Hence it was decided to observe visually the meridian transits estimating the altitude by noting the position with respect to the stars or using crude altitude measurements. The times of the earlier observations were observed on a watch or clock and the clock correction obtained from WWV. Later the times were determined with the aid of stop watches, taking time intervals from WWV signals. This rather meager program of optical observations of the Soviet satellites was undertaken to give supplementary data for use of the radio observations, and particularly to assist in the prediction of position of the satellite so that the 61-ft radar of Stanford Research Institute could be set accurately enough to observe it (the beam width at the half-power point is about 3°). This report contains primarily the visual observations made at the Geophysical Institute by various members of the staff, and a series of observations by OLAF HALVERSON at Nome, Alaska. In addition there is a short discussion of the geometry of the trajectory, the illumination of a circumpolar satellite, and a note on the evaluation of Brouwer's momen factors. *Subject Headings:* **1. Optical satellite observation 2. Satellite tracking.**—*Author's abstract.*

11.1–108 551.507.362.2:551.591

Gulledge, Irene S.; Koomen, M. J. et al. (*all, U. S. Naval Res. Lab., Wash., D. C.*), **Visual thresholds for detecting an earth satellite.** *Science*, Wash., D. C., 127(3308):1242–1243, May 23, **1958.** fig., 5 refs. Also: Garvey, W. D.; Gulledge, Irene S. and Henson, Jean B. **Effect of length of observing time on the visual threshold for detecting a faint satellite.** Ibid. 127(3308):1243–1244, May 23, **1958.** fig., 3 refs. **DLC**—This communication is a review on the visual thresholds for detecting an earth satellite, a research previously carried out by BLACKWELL, and by KNOLL, TOUSEY and HULBURT as published in the *Optical Society of America, Journal*, 36(624), **1946**; 36(480), **1946**; 38(886), **1948.** The results of the survey were calculated, discussed and published by TOUSEY in Vol. 47 of the same journal (*see* 9.9–74 Sept. 1958, *MAB*). In this report a qualitative explanation is given to the results. A satellite at 200 mi altitude can be seen crossing the zenith, from the time when the sun is 7.5° below the horizon until it has set at the altitude of the satellite. High satellites can also be seen well into the night, especially when they pass somewhat away from the zenith in the direction of the setting sun. There is also some effect of the length of observing time. The author suggest that satellite observers should be rotated every 30 min when practicable, and watche should continue uninterrupted for one to two hours. *Subject Headings:* **1. Visibility of artificia satellites 2. Satellite observations. I. Packer, D. M. II. Tousey, R.**—*N.N.*

11.1–109 551.501.8:551.507.362.

Warwick, James W., **Radio observations of Soviet satellites, 1957 Alpha 2 and 1957 Beta 1** *International Geophysical Year, 1957/1958. IGY World Data Center A (Rockets and Satellites) National Academy of Sciences, Wash., D. C., IGY Satellite Report Series*, No. 5, July 30, **1958** 50 p. 26 figs., table, 47 eqs. Also issued as: *Colorado, Univ. High Altitude Observatory Boulder, Scientific Report*, No. 10. **DWB** (629.1388 W299ra)—A report is given on the preliminary results of the analysis of U. S. 20 Mc/s radio observations of Soviet satellites 1957 α and 1957 $\beta 1$, the problems involved, the cataloguing of various kinds of ionospheric fading, th interferometric effects of these satellites, and the basic fading on the records. Details on th spin-fading characteristics of rotating and circularly polarized antenna systems are also dis cussed and analyzed in full. *Subject Headings:* **1. U.S.S.R. satellite Alpha two 2. U.S.S.R satellite Beta one 3. Radio satellite tracking.**—*N.N.*

11.1–110 551.507.362.2:629.19(02)

Soviet writings on earth satellites and space travel. N. Y., Citadel Press, **1958.** 253 p. l figs., tables. **DWB, DLC**—The history of Russian development of astronautics and rocketry since 1924) leading up to the successful launching of the first Sputnik on Oct. 4, 1957 is ecounted, followed by general aspects of rockets, satellites and space travel and uses thereof. Joint Committee on Space Travel was organized in the Astronomical Council of the Akaemiia Nauk in 1954 and an Astronautical Society at the Central Air Club in Moscow (also 954). The International Astronautical Federation coordinates societies of >20 countries. t. II includes a number of articles or interviews with Soviet scientists after Sputniks I, II or II were launched, and covers many aspects of satellite observations and applications (military, ommunications, optical, weather (OBUKHOV), astronomical, solar, travel to moon or planets, iological problems, navigation, power, etc.) *Subject Headings:* **1. Soviet satellites 2. Asonautics. I. Obukhov, Alex.**—*M.R.*

11.1–111 551.507.362.2:629.19

Klee, Ernst (*Munich*), **Satellitenprogramm der Volkssternwarte München.** [Satellite rogram of the National Astronomical Observatory at Munich.] *Naturwissenschaftliche undschau*, Stuttgart, 11(1):7–8, Jan. **1958.** fig. **DWB, DLC**—In order to record the connuing line emitted by Sputnik at a frequency of 40.002 MHz after it had ceased to broadcast 20.005 MHz the National Astronomical Observatory obtained a new receiver which includes ne region 30–180 MHz with an entrance sensitivity of 0.1μV. With this receiver 36 curves ere obtained during the period Oct. 10–Oct. 24, 1957. The diagram (reproduced in this aper) shows a satellite passage on Oct. 13th. The curves show a distinct maximum at 22 hrs 3 min 47 sec, that is, 17 sec after passing over Paris. A marked impulse peak is apparent 22 hrs 16 min 45 sec as the satellite enters the U.S.S.R. The intensity of this signal which ttains $\frac{2}{3}$ of its maximum at a distance of about 1000 km may indicate that a measurement gnal is emitted either from the satellite or from a ground station at the same frequency. *ubject Headings:* **1. Satellite tracking 2. Munich, Germany.**—*I.L.D.*

AERONAUTICAL METEOROLOGY

See also: **Lee waves** (Wallington), 11.1–23; **Analysis of high level PIREPS** (Farthing), 11.1–239; **Turbulence during flight investigation of jet stream** (Fetner), 11.1–240.

11.1–112 551.557.5:629.13(02)

§Chandler, C. L., **Flying jet winds. 1959.** 45 p. figs. Introd. signed Babylon, Long sland, N. Y., Nov. **1958. DWB** (M57.2 C455fL)—An elementary manual giving facts and ustrative diagrams for use by pilots in flying the jet stream: general structure of the atosphere, upper fronts; horizontal and vertical structure of jet stream; tropopause relations; t stream types; flight based on current upper air data, forecast charts, or in-flight information; use and amelioration of clear air turbulence conditions in flight, etc. Practical aids to avigation of jet stream, including synoptic and isotach charts, typical cross sections, climatogical aspects of main jet streams in different areas of world (Pacific, Asia, North America, nd Atlantic), and flying hints are included. *Subject Headings:* **1. Jet stream navigation anuals.**—*M.R.*

11.1–113 551.509.52:551.557:629.135.2

Graham, R. C. (*Supt. of the Trans-Oceanic Aviation Sec., Forecast Div., Met. Br., Toronto*), **pper winds for aviation.** *Royal Meteorological Society, Canadian Branch, Publication*, (3), Feb. 7, **1958.** 8 p. **DWB**—In his presidential address before the Canadian Branch of he Royal Meteorological Society, the author presents a nontechnical account of methods of ind forecasting for upper levels. For wind forecasts up to 500 mb the intuitive system, onsisting of simple analysis of the contours of constant pressure surfaces without the aid of ickness analysis, and the system employing thickness charts are discussed. The fixing of the t stream by analysis from 500 mb to 300 mb, the thickness pattern within and above the opopause, the "Black Sheep" system of forecasting winds (Air Weather Service, U. S. A. F.), c., are considered. The desirable characteristics of an organization for producing upper

wind forecasts for aviation are discussed. *Subject Headings:* **1. Upper air wind forecas 2. Aviation forecasts 3. Black Sheep wind forecast system.**—*I.L.D.*

11.1–114 551.574.7:629.

Gray, Vernon H. (*Lewis Flight Propulsion Lab., Cleveland, Ohio*), **Correlations among i measurements, impingement rates, icing conditions, and drag coefficients for unswept NAC 65A004 airfoil.** *U. S. National Advisory Committee for Aeronautics, Technical Note,* 4155 Feb. 1958. 45 p. 11 figs., 2 tables, 11 refs., 3 eqs. Also: Gray, Vernon H. and von Glah Uwe H. (*both, Lewis Flight Propulsion Lab.*), **Aerodynamic effects caused by icing of an u swept NACA 65A004 airfoil.** *Ibid.,* 4155, Feb. 1958. 47 p. 12 figs., 2 tables, 12 refs. **DWI DLC**—First paper—An empirical relation is derived by which changes in section drag coefi cients due to ice on an NACA 65A004 airfoil are calculable from known icing and operati conditions. The correlation is obtained by use of measured ice heights and ice angles. Initi ice weights are in agreement with droplet impingement data; in glaze conditions, ice weigh increase at progressively greater rates with time. Second paper—At angles of attack le than 4° both rime and glaze-ice formations increased drag, reduced lift, and reduced divi moments. At angles of attack greater than 4°, drag coefficients increased with rime ice; li coefficients generally increased with glaze ice and were variably affected by rime ice; pitchin moment changes were rather erratic and depended on the ice shape. When the airfoil w iced at high angles of attack and rotated to lower angles, large negative pitching-momen were obtained. Ice formations on the airfoil had no significant effects on control-surfa hinge moments. *Subject Headings:* **1. Icing of aircraft 2. Drop impingement on airfoi** —*NACA abstract.*

11.1–115 551.591.36:656.77(417) 551.575.36:656.71(41

*Dixon, F. E., **Annual and diurnal variation of visibility at Shannon and Dublin Airport** *Eire. Meteorological Service, Technical Note,* No. 26, March 1959. 11 p. 4 figs., 4 table 4 refs. **DWB**—An analysis of hourly records of visibility (1951–1955) at Shannon and Dubli Airports to show the comparative frequency of visibilities (visual range) in different categori for different seasons and times of day. Methods of evaluating records and using the "median and "quartile" visibilities, and of converting median visibility to transparency, are set forth Most of the bad visibility, which affects Dublin more than Shannon, comes from Great Britai Worst visibility is in March at both airports, but the minimum frequency of excellent visibilit is in January. Best is in mid-summer. Data are presented in extensive tables and isopleth charts, graphs, etc. for median, quartile and extreme (fog and >25 mi) values. *Subje Headings:* **1. Visibility frequency data, Ireland 2. Fog frequency data, Ireland 3. Aeronautica meteorology 4. Shannon Airport, Ireland 5. Dublin Airport, Ireland.**—*M.R.*

AGRICULTURAL METEOROLOGY

See also: **Drought, U.S.S.R.,** 11.1 6; **Agromet. bibliog.,** 11.1–83; **Precip. and agromet.** (Kusababe), 11.1–258.

11.1–116 551.556:631.4(52

*Tanaka, S.; Kakinuma, S.; Sano, H. and Tanizawa, T. (*all, Kantō-tōsan Agric. Experi ment Station, Second Agronomy Section*), **Effect of roller pressing on the control of wind erosio (Studies on the control of wind erosion, Pt. 2).** *Journal of Agricultural Meteorology,* 10(3/4) 139–142, March 1955. 2 figs., 3 tables, 5 refs. Also: Tanaka, S.; Sano, H.; Tanizawa, T. an Kodera, S., **Pt. 3, Effect of kittatemaki on the control of wind erosion.** *Ibid.,* 10(3/4):143–146 March 1955. 2 figs., 7 tables, 4 refs., eqs. Also: Tanaka, S.; Sano, H.; Tanizawa, T. an Kakinuma, S., **Pt. 4, Prevention [by] sprinkling some bentonite.** *Ibid.,* 13(2):74–76, Oct 1957. fig., 6 tables, 2 refs., eqs. Also: Tanaka, S.; Sano, H. and Kakinuma, S., **Pt. 5, Effec of drill sowing of wheat on the control of wind erosion.** *Ibid.,* 13(4):126–128, May 1958 2 figs., 6 tables, 3 refs. All articles in Japanese with English summaries. (For Pt. 1, *se* 9.11–266, Nov. 1958, *MAB.*) **DWB**—These papers describe in detail a series of experiment to determine how to lessen wind erosion of soil. Among the conclusions reached were th following: 1) Roller pressed fields showed more moisture content and less flying soil than field

pressed by foot. The best time to roll the fields is after the frost period. 2) A clean tilled wheat field contained less moisture near the surface and more flying soil than the kittatemaki field (one using stubble of preceding year's crop). 3) Field and wind tunnel experiments gave proof that sprinkling with bentonite decreased wind erosion. 4) Drill sowing has proved remarkably effective against wind erosion. *Subject Headings:* **1. Wind erosion 2. Soil erosion prevention 3. Japan.**—*M.L.R. (based on authors' abstracts).*

11.1–117 551.506.8:634.75(473)

Ogorodnikov, B. I., **Agrometeorologicheskoe obosnovanie srokov osenneĭ posadki zemlyaniki v tsentral'nykh oblastiakh Evropeĭskoĭ territorii SSSR.** [Agrometeorological basis for the dates of the autumn planting of strawberries in the central regions of the European U.S.S.R.] *Meteorologiia i Gidrologiia*, Leningrad, No. 5:40–43, **1958.** 2 tables, 8 refs. **DWB, DLC**—The method presented for computing the dates of fall planting of strawberries is based upon the warmth factor; while moisture is equally important, it can be controlled and provided by sprinkling. The method is based upon the following relationships: growth of roots of strawberries almost ceases at an upper soil layer temperature of 7–8°C and 3–4 weeks are necessary for plants to take root. The procedure of determining the mean date of transition of soil temperature through 7°C and the probability of transition dates through intermediate values such as 5°C, etc. is described and data on the probability of transition of soil temperature through 7°C in individual years, expressed as deviation from mean long period dates and individual years, are presented. The practical determination of dates of strawberry planting with probability of minimum rooting percent in 20 days, 100% and 75% of all years, the following formulas for Moscow Oblast are given: $D_1 = A - 37$ and $D_2 = A - 27$, where D_1 = limiting date of planting with a probability of root-taking in 20 days in 100% of the years, D_2 = same period for 75% of the years and A = mean date of transition of air temperature through 5°C. The computation of the constants is outlined. *Subject Headings:* **1. Strawberry phenology 2. Agricultural meteorology 3. Strawberries 4. Central U.S.S.R.**—*I.L.D.*

11.1–118 551.508:63 551.510.41:546.264:636.083.1

Uhlíř, P., **Einige für die agrarmeteorologische Forschung entwickelte Messgeräte.** [Some measuring instruments developed for research in agricultural meteorology.] *International Journal of Bioclimatology and Biometeorology*, Leiden, Vol. 1 (Pt. 2, Phytological Bioclimatology), **1957.** 2 p. table, 2 figs.—The author describes the construction and use of an apparatus for measuring the CO_2 content of air in stables. Carbon dioxide is absorbed by a solution of $Ba(OH)_2$ which is colored with phenolphthalein. The instrument, illustrated by means of a diagram, consists of a tubular reservoir, a suction diaphragm and an absorption vessel. The results of measurements carried out in a stable are presented in a table. Also an apparatus to record the duration of dew upon a leaf surface is described with the aid of a diagram. *Subject Headings:* **1. Agrometeorological instruments 2. Carbon dioxide in stables 3. Dew duration recorders.**—*I.L.D.*

11.1–119 551.586:551.556:634

Van Rhee, J. A., **The cropping of fruit trees in relation to windbreak protection.** *Netherlands Journal of Agricultural Science*, Wageningen, 6(1):11–17, Feb. **1958.** 6 figs., table, 2 refs. **DLC**—In the fruit growing districts of Zeeland, where wind damage occurs quite frequently, observations were made during the past five years in order to determine the effect of wind protection by means of living windbreaks. It was found that the yields were influenced by shelter to a high, positive degree. A provisional calculation is made of the most profitable distance between windbreak rows and the net profits obtained with apples and pears in 1956. The causes of the positive effect of shelter are discussed. *Subject Headings:* **1. Windbreak effectiveness in orchards 2. Horticulture 3. Zeeland, Netherlands.**—*A.V.*

11.1–120 551.524.37:632.111

Aerts, R.; Vanwetswinkel, G. et al., **Het ontstaan en de bestrijding van de lentenachtvorst in de fruitteelt.** [Origin of and protection against spring frost for fruit culture.] *Agricultura*, Brussels, 6(2):93–124, March **1958.** fig., 5 tables, 10 refs. French, Dutch and English summaries p. 123–124.—The authors describe the conditions during which late frosts appear;

these causing radiation frosts are the most frequent. They show the extent of the damag which can sometimes be very severe; several factors can influence the intensity of this damag In the second part of the work, the different methods of protection are reviewed and studie Warming up the air by oil-burners seems to be the most popular system. The authors explai the method that they tested and show by figures the very good results obtained in five year of experimentation. By means of this method, protection against frosts can be obtaine efficiently and economically. *Subject Headings:* **1. Spring frosts 2. Frost damages to orchard 3. Frost protection of orchards 4. Belgium. I. Soenen, A.**—*Authors' abstract.*

11.1–121 551.585:63

Selianinov, G. T., **Printsipy agroklimaticheskogo raĭonirovaniia SSSR.** [Principles fo dividing the U.S.S.R. into agroclimatological regions.] *Akademiia Nauk SSSR, Izvestiia Ser. Geog.*, No. 4:97–101, July/Aug. **1957.** map (fold.). **DWB**—Existing contradictions i the field of climatology can be resolved not by regarding climate as a universal self-containe entity but as a natural resource of agricultural production which is intimately related to such climatic factors as sunshine, heat and soil moisture. However, the distribution of solar hea and the geography of plant cultivation appear contradictory and their relationships canno be expressed quantitatively. The agricultural evaluation of climate should be based on the totals of active temperature, the maximum (summer) and minimum (winter) duration of the day and upon all other climatic elements promoting or hindering the utilization of solar heat The author proposes the construction of an agroclimatic map of which the principles of con struction can be employed for the agricultural characteristics of the climates of any geographic expanse of the earth. The fundamental unit of classification is the agroclimatic *belt* which is subdivided into agroclimatic *regions* and the latter into agroclimatic *provinces*. A map of the agroclimatic resources of the U.S.S.R. is presented. The U.S.S.R. is divided into four belts: 1) Arctic with agriculture on covered ground, 2) belt of polar oasis agriculture with very limited cultivation of plants having a minimal need of heat, 3) belt of temperate climates with annual plants and the presence of four distinct seasons and 4) subtropical belt with two seasons. The agroclimatic belts are subdivided into latitudinal-vertical heat zones on the basis of temperature sums and precipitation characteristics. The subtropical belt has seven regions, namely: 1) Mediterranean with dry summer and rainy winter; 2) Colchian with rainy summer, excessive moisture and warmest summer in the U.S.S.R.; 3) Turan, Western Aral region, dry summer and humid winter; 4) Main Caucasus; 5) Minor Caucasus; 6) Mediterranean mountain region and 7) Zakopetdag region. The temperate belt is composed of 5 regions, namely: 1) semideserts of Kazakhstan; 2) arid anticyclonic steppe region with hard wheat, sunflower and maize as principal crops; 3) humid cyclonic forest region; 4) region of maximum continentality and 5) region of monsoon rains. The polar belt is not subdivided. The climatic characteristics of provinces comprise the following: 1) duration of vegetation period and subperiod of sowing and harvesting; 2) relationship of the duration of thermally possible vegetation period to the frost free period; 3) stability and depth of snow cover and 4) frequency of droughts. *Subject Headings:* **1. Agroclimatic regions 2. U.S.S.R.**—*I.L.D.*

FOREST METEOROLOGY—FIRE WEATHER

See also: **Fire weather Conf.**, 11.1–3; **Forest-hydrological investigations** (Delfs et al.), 11.1–26; **Forest met. conf.** (Péczely), 11.1–65; **Forest effects on runoff** (Sokolovskiĭ), 11.1–274; **Forest influences on snow accumulation** (Anderson et al.), 11.1–288; **Forest productivity** (Paterson), 11.1–300.

11.1–122 551.588.6:551.521.3

Baumgartner, Albert, **Sommerlicher Wärme- und Wasserhaushalt eines jungen Fichtenwaldes.** [Summer heat and moisture exchange in a young spruce forest.] Reprint of 6 pages from "Mitt. aus der Staatsforstverw. Bayerns, Munich," **1957.** fig., 2 tables, 6 refs. **DWB** (Reprint file)—Quantitative data on diurnal heat and water economy of a forest as a function of radiation are discussed and given. The measurements were made with a radiometer. The vertical distribution of radiation given in values of cal/cm² day and in percent was measured from 0.2–10 m above the ground. The very upper part of the tree tops is the vital part for

the life of a forest since 60% of the total radiation is absorbed here. Two-thirds of the radiation is spent for evaporation, ⅓ is returned convectionally. *Subject Headings:* **1. Forest radiation interception 2. Forest radiation measurement techniques 3. Absorption by forests.**—*W. N.*

11.1–123 551.5:632.187:061.3

Southern States Fire Conference, 18th, Macon, Georgia, May 21–23, 1957, **Minutes. 1958?** Each paper repaged. Mimeo., loose-leaf. **DWB** (634.96 S827mi)—Contains, in addition to minutes of the conference, a paper by L. E. HUGHES (*U. S. W. B. Tallahassee, Fla.*) entitled **Fire weather forecasting in Florida,** giving a brief history of fire weather forecasting in the U. S. W. B. beginning in 1916, and the Fire Weather Service beginning in 1924 (in the Pacific Northwest) and adding in 1954 a full-time research position in fire weather at Portland, Oreg. Other research began in 1954 in California (Project Firestop), in the West Project Skyfire, and at Asheville, N. C. All told, 36 weather Bureau offices do some fire weather work. The present program at Tallahassee, Fla. is outlined and data pertinent to fire danger in Tallahassee is presented in graphical form (average hourly conditions for January 1957, hourly conditions for a wet day with no rain, for a dry day, and daily average temperatures and daily 2:00 p.m. FM (fuel moisture) and RH. *Subject Headings:* **1. Fire weather services 2. U. S. Weather Bureau Fire Weather Service 3. Southern States Fire Control Conference, Macon, 1957.**—*M. R.*

11.1–124 551.594.22:632.187

†Bennett, W. D., **The control of lightning-caused forest fires; a review of the literature on lightning, lightning fires, and research to control lightning fires; with some recommendations.** *Montreal. Pulp and Paper Research Institute of Canada, Woodlands Research Index,* No. 106, **1958.** 30 p. fig., table, 24 refs. Bibliog., p. 21–30. Mimeo. **DWB** (M94.2213 B472co)—A review of recent U. S. and Canadian literature on lightning and forest fires caused by lightning, and an analysis of the findings in the following subject areas: the importance of lightning as a cause of forest fires, development of thunderclouds and mechanism of lightning, conditions favorable for starting lightning fires, suppression of lightning fires, recognition and mapping of areas susceptible to such fires, recognition of meteorological conditions preceding development of lightning and start of fires, research on control of such fires and on prevention of lightning by cloud seeding, tracking of lightning and thunderstorms by radar and sferics, reduction of lightning damage, etc. The references and bibliography are extensive. *Subject Headings:* **1. Lightning fire research 2. Fire weather research 3. Lightning fire bibliography 4. United States 5. Canada.**—*M. R.*

11.1–125 551.588.6

Botvay, Károly, **Az erdészeti meteorológia időszerű kérdései hazánkban.** [Current problems in forest meteorology in Hungary.] *Időjárás,* Budapest, 61(2):111–116, March/April **1957.** German summary p. 111. **DLC**—The application of general, local and microclimatic information to research on forest types, regional forestry, various types of cutting, natural regeneration, growth of seedlings and afforestation is discussed. Existing research projects in Hungary and some of their results are mentioned. Areas of desirable future research are indicated; these include renewal of studies on shelter belts (which have lost much of their former vigor), especially problems connected with harmful shade effects and root competition, on which no original research has been made in Hungary. *Subject Headings:* **1. Forest meteorology 2. Shelter belts 3. Hungary.**—*G. T.*

11.1–126 551.579.2:551.588.6(473,571)

Rakhmanov, V. V., **Forest-cover effects on snowpack accumulation and snow melting in relation to meteorological conditions.** *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 1957,* [*Transactions*], Vol. 4, pub. **1958.** p. 210–221. 6 figs., 2 tables, 16 refs. **DWB, DLC**—The problem is examined on the basis of observations from 1947–1954 at 86 hydrometeorological stations in central European U.S.S.R. and W. Siberia. In more than 90% of all cases snow reserves in the forest (in terms of water) at the end of winter exceeded those in the field by an average of 18%, the difference varying from 5–10% to 20–25% according to meteorological conditions during accumulation. The

higher values were observed in winters with cyclonic activity and stormy weather changes, and the lower values during prolonged anticyclonic weather. The difference between forest and field snow reserves increased with increasing temperature sums. The increase in the ratio between forest and field snow reserves is attributable to a longer detention of cold air in the forests. Melting in the forest occurs 1–2 days to several weeks later than in the field, depending on weather. A knowledge of meteorological conditions during the melting period provides a basis for forecasting the general development of floods in the rivers of forested regions. *Subject Headings:* **1. Forest effects on snow melt runoff 2. Central European U.S.S.R. 3. Western Siberia.**—*SIPRE abstract* 16938.

11.1–127 551.588.6:551.556.2:631.94

Mirotvorskaia, N. K., **Vliianie lesnykh polos na rezhim meteorologicheskikh elementov v usloviiakh iuga Ukrainy.** [The influences of forest belts on the regime of meteorological elements in southern Ukraine.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologischeskiĭ Institut, Trudy*, 4:59–61, **1955.** fig. **DLC**—The author discusses the results of microclimatic observations made during the summer months of 1950, 1951 and 1952 near forest strips having a height of 15–20 m and a width of 100 m. Wind velocity measured in front of both dense and sparse forest strips, indicate that at 35–40 m the wind velocity increases but is stronger in front of a dense forest. The quantitative effect of the size of the strips upon wind depends upon the height and construction of the strips. The greatest effect on wind is produced by strips in which the relationship of clearings to the total area of vertical projection of the strip is 70%. The height of snow cover was greater in dense forests than in adjoining fields and greater in the former than in sparse forests. The air temperature in a dense forest is on the average 2°C lower than in the open field, but the difference in temperature between a sparse forest and open field is slight (0.4°C). Also data on the effect of forest belts on soil temperature show a higher soil temperature near forest strips. *Subject Headings:* **1. Forest shelter belt effects 2. Ukrainian S.S.R.**—*I.L.D.*

INDUSTRIAL METEOROLOGY

11.1–128 551.578.46:625.8

*Chapman, William P., **Calculating the heat requirements of a snow melting system, Pt. 1, North Mideast region.** *Air Conditioning, Heating and Ventilating*, N. Y., 53(9):67–71, Sept. **1956. Pt. 2, West Central Rocky Mountain Region.** *Ibid.*, 53(10):81–84, Oct. **1956. Pt. 3, Pacific Northwest Region.** *Ibid.*, 53(11):96–99, Nov. **1956. Pt. 4, Southeast Central Region.** *Ibid.*, 53(12):71–74, Dec. **1956. Pt. 5, Northwest Central Region.** *Ibid.*, 54(1):63–66, Jan. **1957.** 4 tables. **Pt. 6, Northeast Region.** *Ibid.*, 54(2):101–105, Feb. **1957. Pt. 7, Southwest Region.** *Ibid.*, 54(3):64–67, March **1957. Pt. 8, Northeast Central Region.** *Ibid.*, 54(4):87–91, April **1957. Pt. 9, New England.** *Ibid.*, 54(5):72–76, May **1957. Pt. 10, Southwest Central Region.** *Ibid.*, 54(6):85–88, June **1957. Pt. 11, Central Atlantic Coast region.** *Ibid.*, 54(7):57–61, July **1957. Pt. 12, (Concluding article).** *Ibid.*, 54(8):81–96, Aug. **1957.** Each article contains about 4 tables. Some have figs. **DLC**—In a series of 12 articles, details are given of heat requirements for snow melting systems on: 1) residential walks or driveways; 2) commercial sidewalk and driveways, hospital steps; and 3) toll plazas of highways and bridges, loading areas of airports, etc., respectively. The U. S. is divided into 10 regional units and data for 3 representative cities in each unit presented in tables and discussed. The first article gives basic definitions and equations and discusses meteorological factors such as: 1) wind speed, 2) air temperature, 3) relative humidity, 4) snowfall. Heat required to raise the temperature of the snow to 32°F, to melt the snow, to evaporate part of it and to keep the snow-free area in thermal balance, enter into the equations. The mean number of days with 1″ or more of snow on ground, average number of inches of snowfall per year, greatest snowfall in 24 hrs, greatest depth of snow on ground, and mean annual number of days with 1″ or more of snowfall are considered as the pertinent snowfall data for each station. Temperature data considered are: the percent of winter hours with no snow at temperatures >32°F, and ≤ 32°F, mean temperature and wind speed during freezing period; and for period of snowfall the free area ratio and the frequency distribution of snowfall hours at various required heat outputs; and time and heat output rates for idling period and for

melting period. Actual examples of climatological and heat requirement data are given for specific snowstorms in each region, revealing exceptional circumstances that affect operational accuracy of design data as calculated in these tables. Length of operating season depends on whether system is run idle during snow season even if no snow is on ground. Variation from year to year is considerable, especially at borderline places for installation (such as New York). At places like Washington, D. C. snow is so rare that systems are seldom installed. Most of the pertinent data are summarized in tabular and graphic form in Part 12 and the use of the tables explained with examples of calculations involving debatable points such as whether or not to design for the unusual (one in 4 year) snowstorm with high winds and low temperatures, when a more modest design would give partial clearance even in the worst conditions. Also expensive installation and low operating costs of one type of system must be balanced against cheaper installations and higher operating costs of other types. The region with the greatest and longest lasting snow cover is the Northeast (Article No. 6), but conditions there are more stable from year to year than elsewhere. Isarithm charts show design data for Class I, II and III snowmelting systems. Regional data are discussed as follows: Regions 1) North Mideast: Detroit, Columbus, and Pittsburgh; 2) West Central: Boise, Reno and Ogden; 3) Pacific Northwest: Seattle, Portland and Spokane; 4) Southeast Central: Memphis, Chicago and St. Louis; 5) Northwest Central: Great Falls, Mont., Cheyenne, Wyo.; and Rapid City, S. Dak.; 6) Northeast: Buffalo, Burlington, Vt., and Caribou, Maine; 7) Southwest: Albuquerque, Amarillo, Oklahoma City; 8) Northeast Central: Duluth, Minneapolis and Sault Sainte Marie; 9) New England: Hartford, Boston, Falmouth; 10) Southwest Central: Colorado Springs, Lincoln, Nebr., and Salina, Kan.; 11) Central Atlantic: New York, Philadelphia, Washington. *Subject Headings:* **1. Snow melting system heat requirements 2. Design data for snow melting systems.**—*M.R.*

11.1–129 551.521.1:621.47

Markov, G. I., **Tekhnologicheskie osobennosti izgotovleniia zhelezobetonnykh paraboloidnykh zerkal'nykh otrazhateleĭ gelioustanovok i nekotorye pokazateli ikh raboty.** [Technological properties in the manufacture of reinforced concrete paraboloid mirror reflectors for solar installations and some of their performance characteristics.] *Akademiia Nauk SSSR. Energeticheskiĭ Institut, Ispol'zovanie Solnechnoĭ Energii*, Sbornik 1. Issued Moscow, **1957.** p. 99–109. 10 figs. **DWB** (621.47 B347is Vol. 1)—A detailed description is given of the manufacture and mounting of a paraboloid installation with a mirror of 10 m diameter set up in the heliotechnical laboratory of the Energy Institute of the Academy of Sciences of the U.S.S.R. at Tashkent in 1946. The technical aspects of manufacturing this large reinforced concrete reflector comprise the following: use of geometrical optics to fashion precise metallic molds of parabolic shape; replacement of a base by a cheaper earthen base; fashioning the reinforced concrete cover by means of a metallic frame with an angular precision of 10–12 ft; and a curvature of the glass according to a given curvilinear surface (in two directions) in the cold state at the moment of attachment. With the aid of photographs, diagrams and formulas the author describes the construction of the mold, the method for the optical adjustment of the parabolic mold relative to the reflector, which was an autocollimating mirror; the construction of the autocollimating mirror; the preparation of the reinforced concrete base and the placing of the armatures upon it, etc. The errors inherent in this installation are discussed and an equation for employing the heat amount reflected by this mirror, is given. *Subject Headings:* **1. Solar installation mountings 2. Solar reflectors.**—*I.L.D.*

11.1–130 551.584.6:629.123.4

†Cohen, Raymond K. and Nelson, Michael, **Evaluation and control of sweat damage.** *Stanford Research Institute, Menlo Park, Calif., SRI Project S-2179, Report,* No. 5; Technical Report, No. 1, May 1, **1958.** 123 p. 17 figs., forms, 18 tables, 91 annotated refs. **DWB** (M(051) S785te)—A thorough study was made of sweat damage to canned goods shipped by merchant vessels from the west coast (Portland, Stockton, San Francisco and Los Angeles) to the east coast through the Panama Canal during 1952 to 1956. Value of claims increased 7 fold during this period, losses in 1956 amounting to about $1,000,000. Physical damage was observed on 6% of cases loaded during January and February 1956, with 0.3% of cases containing severely rusted cans, whereas at the end of the voyage 15% of cases showed some

damage and 3.6% severely rusted cans. A marked seasonal distribution of damage was noted—80% occurring on vessels which sailed between November and March, but little relationship between damage and port of loading, a definite relation between damage and trade route (vessels stopping in Caribbean ports suffered 4 to 5 times as much damage as on other routes), cargo stored in the upper deck suffered the lightest damage and, finally, no relation was found between damage and cargo dehumidification (perhaps because of incorrect observation of the dehumidification equipment). Cans start to sweat very soon after leaving California for Panama. Orientation of cases in the hold is also a factor. Of 30 or 40 control measures considered, the most likely to be effective is that of treatment of the surface of the can before labelling. Ventilation measures, air-tightening the hold, dehumidification and a few other measures need further investigation. *Subject Headings:* **1. Sweat damage to cargo 2. Ships' hold climates 3. Caribbean.**—*M.R.*

11.1–131 551.586:691.57

Bussell, K. R. and Rischbieth, J. R., **Effect of climatic conditions on the weathering of paints.** *Australia. Defence Standards Laboratories, Victoria, Report,* 222, Feb. **1956.** 13 p. 5 figs., tables, 5 refs. **DWB** (M:667.61 B981ef)—The effect of climates in different parts of Australia on the durability of paint films has been studied by exposing for two years identical sets of painted panels in 8 localities. The exposure sites covered temperate marine, temperate semi-industrial, subtropical semi-industrial, hot dry, tropical rural, and equatorial oceanic climates. The program included several types of house paint systems on wood and steel panels, an anticorrosive primer on steel, an aircraft finishing scheme on aluminum and fabric. *Subject Headings:* **1. Weather effects on paint durability 2. Industrial meteorology 3. Australia.**—*Authors' abstract.*

11.1–132 551.5:69:331.68

La contribution des services du S.M.M.A. a l'indemnisation du chômage-intempéries des travailleurs du Bâtiment et des Travaux Publics. [Contribution of the services of the S.M.M.A. to bad-weather unemployment compensation for workers of the construction industry and of public works.] *La Météorologie,* Paris, No. 42:133–134, April/June **1956. DWB**—Describes details of cooperation between the French weather service and the unemployment compensation fund, in connection with compensation payments on the grounds of shutdowns in the building industry and public works. Information supplied by the weather service is used in determining the legality of shutdowns, for improving compensation procedures and for anticipating the financial and economic incidence of bad-weather unemployment. *Subject Headings:* **1. Industrial meteorology 2. Unemployment-weather relationships.**—*G.T.*

MEDICAL METEOROLOGY

See also: **Weather effects on pulmonary embolism** (Berg), **11.1–293**; **Nautical bioclimat.** (d'Avanzo), **11.1–294**; **Sunshine and body temp.** (Wagner), **11.1–296.**

11.1–133 551.586:613.15

†Wells, William Firth, **Airborne contagion and air hygiene: an ecological study of droplet infections.** Cambridge, Mass., Harvard Univ. Press (for the Commonwealth Fund), **1955.** 423 p. 53 figs.+32 figs. in appendix, tables, bibliog. p. 379–404, eqs. **DLC** (RB152.W4)—This substantial textbook deals with: Air-borne contagion, physics and chemistry of droplets and nuclei (atomization, evaporation, condensation, aerodynamics of nuclei, and sampling), biophysics and biochemistry of droplet nuclei disinfection (radiation and humidity); viability, longevity, etc.; air hygiene: ventilation, radiation, in schools, dormitories, homes, cities and dust-borne infections, ecology of droplet infections, latitudinal and seasonal aspects of many infectious or contagious diseases are shown graphically (based on ample clinical and other types of statistics and for various regions), effects of crowding, age, birth-order, etc. Many figures and tables illustrate quantitative aspects. *Subject Headings:* **1. Air-borne diseases 2. Droplet infections.**—*M.R.*

11.1–134 551.586:616-001.1:537.533

David, Th. A.; Minehart, J. R. et al. (*U. S. A.*), **Observations of the effects of artificial ionization on the burned patient (Preliminary report).** *International Journal of Bioclimatology and Biometeorology*, Leiden, Vol. 1 (Pt. 4, Human Bioclimatology), **1957.** 4 p. 3 tables, 6 refs. **DWB**—Thirty-two patients who suffered burns of various degrees, involving small to extensive parts of the body and four surgery cases were exposed to ions of negative polarity. The authors believe that negative ionization is a useful adjunct in treating burns of different origin. Rapid drying of the burned and ulcerated areas and decreasing exudation were noted in the majority of all patients. A chart giving the clinical details on the course of healing for each subject is included. *Subject Headings:* **1. Burns 2. Negative ionization effects on burns. I. Fasano, J. II. Kornblueh, I. H.**—*I.L.D.*

11.1–135 551.586:616.988.23 613.2:616.988.23

Irving, F. A. (*Great Britain*), **The bioclimatic approach to the prevention of poliomyelitis.** *International Journal of Bioclimatology and Biometeorology*, Leiden, Vol. 1 (Pt. 4, Human Bioclimatology), **1957.** 3 p. ref. **DWB**—The author discusses the dependence of the incidence of poliomyelitis upon seasonal conditions, the relation between outbreaks of poliomyelitis and falling river levels in England, the relation between the seasonal manifestation of salt depletion in the diet and the incidence of poliomyelitis, the polio epidemic in the Matése Islands during 1942–1953 in relation to milk in the diet which neutralizes acids and thus counteract the destructive action of acids upon the polio virus. It is concluded that salt depletion and a diet that reduces stomach acidity are important factors in the incidence of poliomyelitis. *Subject Headings:* **1. Poliomyelitis 2. Dietetic influences on polio virus 3. Water level variations—poliomyelitis relationships 4. England.**—*I.L.D.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Weather radar** (Hiser, Freseman), 11.1–12; **Methods of measurement and obs.** (Petit), 11.1–35; **Kharkov Met. Observatory** (Dubinskiĭ), 11.1–77; **Radio satellite tracking** (Warwick), 11.1–109; **Drought frequency determination** (Kaczmarek), 11.1–263.

11.1–136 551.501.81:551.501.4:551.557

Ervet, P., **Utilisation de la distance oblique dans les sondages vent au radar.** [Use of the oblique distance in wind soundings by radar.] *La Météorologie*, Paris, Ser. 4, No. 51:209–221, July/Sept. **1958.** 9 figs., 6 tables, 6 refs. French, English and Spanish summaries p. 209. **DWB**—Variation of the radar-balloon oblique distance instantaneously gives a near measurement of the speed of wind in altitude without making the graphic or numerical analysis of the sounding. This method of approximate wind measuring gives an immediate knowledge of upper air wind. This statistical study, based on 1200 soundings and carried out with an automatic pursuit radar at the Observatory of Trappes, shows in % the chances of success and the limits within which certain approximations may be made on the speed and the direction of the upper air wind between 3–4 km and 22 km height. This study shows that the method recommended can be adopted in 70% of the cases. A few typical soundings are submitted to illustrate this method. *Subject Headings:* **1. Upper air wind measurement techniques 2. Radar wind observations 3.Trappes, France.**—*A. V. and author's abstract.*

11.1–137 550.3:517.51 551.501.45:551.551

†Craddock, J. M.; Charnock, H.; Rushton, S. and Neumann, J., **Analysis of geophysical time series.** *Royal Statistical Society, Journal, Ser. A*, 129(4):387–439, **1957.** Contents: Craddock, J. M.: **An analysis of the slower temperature variations at Kew Observatory by means of mutually exclusive band pass filters,** p. 387–397. 8 figs., ref., 10 eqs. Charnock, H.: **Notes on the specification of atmospheric turbulence,** p. 398–408. 7 figs., 18 refs., 13 eqs. Rushton, S. and Neumann, J.: **Some applications of time series analysis to atmospheric turbulence and oceanography,** p. 409–425. 22 eqs., refs. p. 422–425. **Discussion on the**

papers, p. 425–439. 5 figs., numerous eqs. **DWB** (M:519 C884an)—These three papers were read at a joint meeting of the Royal Statistical Society and the Royal Meteorological Society on May 15, 1957. The first paper deals with application of time series analysis to a meteorological problem—temperatures at Kew. The second deals with spectral analysis by use of periodograms for determining turbulent fluctuations, using meteorological data, and the third with the use of periodograms, spectrograms and correlograms for micrometeorological and general circulation studies of the atmosphere and ocean. Several examples are given in detail, with graphical illustrations. In the discussion by G. M. JENKINS, S. K. ZAREMBA, G. A. TUNNELL, M. B. PRIESTLEY, M. J. TUCKER and the authors, numerous other examples are presented. *Subject Headings:* **1. Spectral analysis 2. Geophysical time series 3. Turbulence analysis 4. Time series analysis 5. Kew Observatory, Eng.**—*M.R.*

11.1–138 551.501.45:551.557.36:519.24

Davies, M. (*Central Electricity Generating Board, London*), **Noncircular normal wind distributions.** *Royal Meteorological Society, Quarterly Journal*, London, 84(361):277–279, July **1958.** fig., 8 refs., eqs. **DWB, DLC**—Extending previous work of BROOKS, CARRUTHERS et al. (*see* 10A–10, 10A–12, 10A–161, Jan. 1959, *MAB*), on circular normal wind distributions, a series expansion is developed for deriving distribution of wind speeds for winds of noncircular normal distribution when the wind vector is symmetrically distributed around the vector mean wind, and an example of a numerical calculation of the probabilities for a specific case is shown graphically for various values of the vector standard deviation. (F against v/v for different values of v/σ_x.) *Subject Headings:* **1. Noncircular normal wind distributions 2. Upper air wind computation 3. Statistical methods to meteorology.**—*M.R.*

11.1–139 551.501.81:551.515.4:551.578(52)

†Imai, I. (*Met. Res. Inst., Japan*), **Radar study of a dissipating thunderstorm.** *Papers in Meteorology and Geophysics*, Tokyo, 8(1):81–97, April **1957.** 21 figs. (incl. photos), 16 refs. **DWB**—Results of radar observations of thunderstorms that occurred in the western Kanto district on 14 Aug. 1956 are described. It was found that in general the isobronts preceded radar echoes by about 20 km. Detailed observations of an anvil cloud which drifted eastward from the mother thunderstorm were made with RHI scope. Ice particles or snowflakes falling from the anvil top formed trail patterns and a well-defined bright band as in the case of warm-front type precipitation. Downward protuberances or "stalactites," probably caused by the evaporative cooling of snowflakes falling into dry air, were found at the base of the anvil. They extended downward across the bright band and formed streaking rain patterns under the band. Judging from the slope and the movement of rain patterns and the observed variation of raindrop size-distribution with time, the generating sources of the rain patterns may be ascribed to the stalactites. A lowering of the bright band, of about 200 to 300 m, was also found at its leading edge. *Subject Headings:* **1. Radar observation of thunderstorms 2. Radar precipitation stalactites 3. Kanto district, Japan.**—*Author's abstract.*

11.1–140 551.501.81:551.510.7:551.576

Richards, William J. and Watson, Bruce F. (*both, U. S. Army Signal Res. & Dev. Lab., Fort Monmouth, N. J.*), **Weather radar and nuclear weapons.** *Weather Radar Conference, 7th, Miami Beach, Florida, Nov. 17–20, 1958, Proceedings*, issued **1958.** Sec. D:49–56. 4 figs., table. **DWB** (M01.81 R124pc)—The advent of nuclear weapons has created a new and important role for weather radar. The radioactive cloud which is generated by a nuclear explosion is detectable and can be measured on an RHI under conditions of visibility and illumination which prevent the use of visual triangulation and aircraft techniques. Surveillance on the PPI permits the detection and precise location of a nuclear burst within range capabilities. This information on cloud dimensions and location constitutes important input data for the prediction of fallout patterns. Several slides and a short film illustrate results obtained with radar set AN/CPS-9. A corollary benefit arises from the basic ability of weather radar to detect precipitation; it thereby provides a means of accounting for the scavenging of radioactive material by rainfall. A possible method is proposed for using radar data in solving this "rainout" problem. *Subject Headings:* **1. Radar observation of radioactive clouds 2. Radioactive fallout pattern forecasting.** *Authors' abstract.*

11.1–141 551.501.81:598.2

Richardson, R. E.; Stacey, J. M. et al. (*all, Lincoln Lab., M.I.T.*), **Radar observation of birds.** *Weather Radar Conference, 7th, Miami Beach, Florida, Nov. 17–20, 1958, Proceedings,* issued **1958.** Sec. D:1–8. 13 figs., 8 refs. **DWB** (M01.81 R124pc)—Natural overwater targets appear in the first 40 mi of the PPI of the experimental radar at South Truro even when the sky is clear. During periods of anomolous propagation they are visible to 100 mi at some azimuths. On many spring and fall nights the PPI is blanked by such targets to more than 50 mi. At the Sixth Weather Radar Conference the authors discussed an experiment then in progress that indicated these radar returns were due to birds (RICHARDSON et al.; *see* 9H–83, Aug. 1958, *MAB*). The experiment, which has now been completed, demonstrates that the identification was correct and gives information about the diurnal and seasonal habits of birds, as well as showing their migrations. *Subject Headings:* **1. Radar echoes from birds 2. Bird migration 3. South Truro, Mass. I. Kohler, H. M. II. Na Ka, F. R.**—*Authors' abstract.*

11.1–142 551.501.81:501.501.4:551.557

Robuchon, A. and Ervet, P., **La mesure du vent en altitude à l'aide d'un radar.** [Measuring upper air wind by means of radar.] *La Météorologie,* Paris, Ser. 4, No. 51:153–159, July/Sept. **1958.** 4 figs., 9 refs. French, English and Spanish summaries p. 153. **DWB**—Measuring wind by establishment of the horizontal projection of the balloon trajectory—particularly taking into account the direction of the wind—leads to a lack of precision which appears incompatible with the use of a high precision automatic pursuit radar. This note is a study of the essentially practical character with a view to facilitating the analysis of radar wind measurements. The principle of the method is based on the analysis of the wind vector into its radial and cross wind components. Direction and speed of the wind may be numerically calculated starting from the radial and cross components. In the absence of an adequate calculator—made applicable to the radar—calculations can be made graphically with the help of a chart. Description and utilization of this chart are given. *Subject Headings:* **1. Upper air wind measurement techniques 2. Radar wind observation 3. Numerical and graphical analysis of soundings 4. Trappes, France.**—*A. V. and authors' abstract.*

11.1–143 551.501.81:551.510.62

Anderson, W. L. (*Univ. of New Mexico*); Beyers, N. J. (*White Sands Missile Range, New Mexico*) and Fannin, B. M. (*Univ. of Texas*), **A low elevation angle radar refraction check.** *Weather Radar Conference, 7th, Miami Beach, Florida, Nov. 17–20, 1958, Proceedings,* issued **1958.** Sec. E: 44–49. 3 figs., 3 eqs. **DWB** (M01.81 R124pc)—In order to determine the feasibility and limitations of correcting radar data at low elevation angles, a refraction check was made using C-band and X-band missile tracking radar over two similar fixed paths of known geometry. Observed elevation angles have been compared with computed angles obtained from ray tracing methods. Radar precision was maintained at .25 mi or better with both C-band and X-band radar. Both systems had path lengths of about 45 mi and elevation angles of one degree. Refractive index profiles for ray tracing were derived from meteorological data obtained from surface observations, radiosondes, wiresondes and airborne refractometer soundings made at or near the time of radar observations and the location of the ray paths. Ray tracing methods assuming horizontal stratification were used. A good correlation between observed and computed elevation angles resulted. It was found that the errors due to atmospheric refraction reached an order of magnitude greater than the radar instrumental error. It was also found that the meteorological information considered most reliably applicable generally resulted in the best correlation between observed and computed angles. *Subject Headings:* **1. Radar data correction 2. Ray tracing techniques 3. Refractive index.**—*Authors' abstract.*

11.1–144 551.501.81:551.501.83:551.508.94

Atlas, David (*GRD, A. F. Camb. Res. Center*), **Radar as a sferics detector.** *Weather Radar Conference, 7th, Miami Beach, Florida, Nov. 17–20, 1958, Proceedings,* issued **1958.** Sec. C:1–8. figs., 11 refs., 2 eqs. **DWB** (M01.81 R124pc)—The characteristics of sferics as a function of frequency are discussed and a first approximation is made of their energy spectrum in the radar band. The stronger sferics recorded at 600, 1200, and 2800 mc/s fit

the extrapolated spectrum of Watt and Maxwell for the stepped leader. The structure of the radar sferics is also consistent with a step-leader type process. Moderate stepped-leaders may be detected by common 10 and 23 cm radars at ranges of more than 100 mi, and by 3 cm radars at 10–30 mi. Radiation from the return stroke is generally not detectable by radar. Detection probability by a scanning beam and polarization effects are discussed. Radiation from an isolated storm appears to emanate most frequently from the uppermost ice crystal region. High sferics counts on the PPI scope of a 23 cm radar appear to indicate severe weather; unfortunately, the converse does not appear to hold. *Subject Headings:* **1. Radar sferics detectors 2. Sferics frequencies.**—*Author's abstract.*

11.1–145 551.501.81:551.589.5:656.71

Austin, James M. and Glass, Morton (*both, M. I. T.*), **Ceiling and visibility fluctuations.** *Weather Radar Conference, 7th, Miami Beach, Florida, Nov. 17–20, 1958, Proceedings,* issued **1958.** Sec. I:9–15. fig., 4 tables, ref. **DWB** (M01.81 R124pc)—The objective of the study was to determine whether radar information could be utilized to predict short-period variations in ceiling and visibility. An initial study indicated that the ceiling fluctuations at Bedford Airport were related to the echo intensity variations. However, this phase of the investigation was discontinued pending the operation of recording equipment at the airport. Conventional measurements at Logan Airport demonstrate that an increase (or decrease) in precipitation intensity is accompanied, on the average, by a lowering (or raising) of the ceiling and visibility. The study was based upon approximately 600 hrs of data taken during periods of low ceilings and visibilities. *Subject Headings:* **1. Ceiling and visibility fluctuations 2. Radar analysis of ceiling and visibility variations.**—*Authors' abstract.*

11.1–146 551.509.329:551.510.721

Austin, Pauline M., **Application of weather radar to fallout prediction.** Massachusetts Institute of Technology. Dept. of Meteorology. Weather Radar Research, Contract DA-36-039 SC-75030, Quarterly Technical Report, No. 3, Dec. **1958.** 12 p. fig. **DWB** (M01.81 M141rqe)—Relatively few contour and R-meter data have been taken during the past quarter chiefly because of the lack of suitable storms, but occasionally because of radar malfunction. The SCR-615-B radar has required an unusual amount of repair and maintenance work. Arrangements have been made to renew the direct measurements of radioactivity in precipitation in order to observe the short time variability in different types of storms. In analytical work efforts are now being directed towards phase D, the application of the studies of storm structure to the problem of rainout prediction. The types of storms under consideration are air mass showers, summertime cold fronts, selected warm frontal storms and coastal lows. Representative wind fields have been chosen and consideration is being given to the three-dimensional motion of radioactive particles and the simultaneous development and motion of hydrometeors in the storms. Two substudies on storm structure are discussed briefly. One is the study of the water budget for a selected storm and considers the relative importance of advection and convection in providing liquid water and water vapor for the development of precipitation. The other is the study of the spectrum of turbulence in the atmosphere. *Subject Headings:* **1. Radioactive fallout forecasting 2. Weather radar for fallout forecasting.**—*Author's abstract.*

OBSERVATIONAL DATA

See also: **Antarctic exped. data of the "Ob" 1955–56,** 11.1–8; **World weather records, 1941–1950** (U. S. W. B.), 11.1–32; **Phenological observers manuals** (Seyfert), 11.1–33; **Tropical cyclone data, W. Pacific and China Sea, 1884–1955** (Chin), 11.1–38; **IGY solar radiation program** (Bruzek), 11.1–40; **Met. data, Charcot Station** (Dubois), 11.1–41; **IGY geomagnetic program** (Lebeau), 11.1–42; **IGY World Data Centers,** 11.1–44; **Soviet Arctic exped.** (Gakkel'), 11.1–51; **Infrared radiation meas., McMurdo Sound** (Gergen), 11.1–54; **Strawberry phenology** (Ogorodnikov), 11.1–117.

11.1–147 551.506.3:551.510.522

Gal'tsov, A. P., **Opyt analiza klimatoobrazuiushchikh protsessov v prizemnom sloe vozdukha po nabliudenniam v odnom punkte.** [An experiment of analyzing climate forming

processes near the ground by observational data of a single station.] *Lietuvos TSR Mokslų Akademija. Geologijos ir Geografijos Institutas, Moksliniai Pranešimai*, 5:71–82, **1957.** fig., 6 eqs. **DWB**—It is shown that by analyzing standard records of a single meteorological station with no use of any supplementary data it is possible to produce the qualitative analysis of the climate forming processes in the surface layers of the atmosphere. *Subject Headings:* **1. Climate forming processes 2. Local climatology 3. Observational data analysis.**—*Author's abstract.*

11.1–148 551.506.3:551.515.4

*Japan. Meteorological Agency, **Five-year report on thunderstorms, 1951–1955.** Issued Aug. **1957.** 248 p. Almost entirely tables and charts.—Elaborate tables of hourly, monthly and annual frequencies of thunderstorms at a dense network of stations throughout Japan, during the 5 years (1951–55), including over 150 pages of charts of Japan and Hokkaido, showing thunderstorm distribution by ¼° squares of latitude and longitude according to several arrangements of the data. *Subject Headings:* **Thunderstorm frequency data 2. Japan.**—*M.R.*

11.1–149 551.506.3 551.583.3

Kolobkov, N. V., **Kontrasty pogody.** [Weather contrasts.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:56–60, Jan. **1958.** 10 refs. **DWB, DLC**—The author points out that 1956 and 1957 were marked by stormy and unusually contrasting weather in the Northern and Southern Hemispheres. The unusual intensity of atmospheric processes is indicated by the severe monsoon floods which occurred in India (1956), the intense typhoons in Korea and Japan (1956), storms on the Atlantic coast of the U. S., etc. A detailed account is then given of unusual seasonal and monthly weather contrasts that occurred during the same period. In 1955/56 severe frosts in Western Europe contrasted with the simultaneous penetration of warm air masses into Arctic latitudes from the south through the Bering Sea. The spring of 1956 was extremely cold in Europe, North and South America, and the negative temperature of the spring continued in Europe into the summer but the summer of 1956 was very warm in Asia. Numerous other examples of contrasting weather conditions are cited. The warm winters of 1954/55 and 1956/57 were produced by a western form of circulation (W) but the cold winter by a meridional form (C); the latter continued into the spring of 1956. Toward the end of June the W type of circulation became dominant and continued into January and February 1957. In March 1957 type W was replaced by eastern (E) circulation type and continued until May 1957. The cause of the intensified circulation lies in increased solar activity. In 1955 the 19th cycle of the 11-year cycle began its upswing. The activity increased very intensely and at a high level since the maximum of the 11-year cycle proceeds against the background of the extreme secular cycle. In 1957 the peak of the 11-year cycle was reached. *Subject Headings:* **1. Weather anomalies 2. Weather cycles 3. Southern Hemisphere 4. Northern Hemisphere.**—*I.L.D.*

11.1–150 551.506:551.524(437) 551.507.1:551.508.26

*Quitt, Evžen, **Průzkum teplotních poměrů Gottwaldova-Zlína za jasného letního dne.** [Investigation of the temperature conditions of Gottwaldov-Zlín on a cloudless summer day.] *Meteorologické Zprávy*, Prague, 10(4):95–97, **1957.** 4 figs., 7 refs. Russian and German summaries p. 95. **DWB**—On June 14, 1956 temperature was measured throughout the city of Gottwaldov-Zlín and surroundings, in the morning, afternoon and evening, by means of a thermometer mounted on a car. The instrument, its mounting and the method of measurement are described and illustrated. Temperatures measured in the different sections—business, park, residential and open locations—are graphically presented. *Subject Headings:* **1. Urban temperatures 2. Temperature measurements 3. Mobile temperature instruments 4. Gottwaldov-Zlín, Czechoslovakia.**—*G.T.*

11.1–151 551.506.3:551.577(497.1)

*Yugoslavia. Hidrometeorološka Slüžba, **Padavine u Jugoslaviji: rezultati osmatranja za period 1925–1940.** [Precipitation in Yugoslavia: results of observations for the period 1925–1940.] Issued Belgrade, **1957.** 571 p. Almost entirely tables+18 charts. (*Prilozi*

Poznavanje Klime Jugoslavije, No. 2). **DLC** (Slavic)—This publication is an important contribution to the knowledge of the Yugoslav climate; it is a continuation of the publication which came out in 1952 and dealt with temperature, wind and cloudiness. It includes an index of the pluviometric stations, mean monthly and yearly precipitation (1925–1940), monthly and yearly precipitation for each year, maximum daily precipitation with date of occurrence for each month and each year, mean number of days with precipitation, mean daily intensity of precipitation, and other statistical data regarding precipitation. Charts relating to yearly, seasonal and monthly distribution of precipitation are included. *Subject Headings:* **1. Precipitation data 2. Yugoslavia.**—*A. V.*

11.1–152 551.506.1:551.511.13:551.571:551.577.31

Keitz, Edwin L.; Fisher, Edwin L. et al., **Further studies of heavy precipitation.** (In: N. Y. Univ. College of Engineering. Research Div. Dept. of Meteorology and Oceanography, Contract AF 19(604)-1387, **Final Report,** June **1958.** p. 23–31. 3 figs., 4 tables, 7 refs.) **DWB** (M15 N532s)—Six hourly synoptic precipitation reports have been correlated with 12 hr forecasts of the stability indexes and the integrated mass of water vapor expressed in inches of precipitable water. The results show that higher intensities of precipitation tend to occur when the precipitable water is high and the forecasted stability index is low. There is also an indication that the greater the ratio of precipitation to precipitable water, the lower is the stability index. *Subject Headings:* **1. Hourly precipitation data 2. Precipitable water 3. Precipitation intensity-stability relationships. I. Miller, James E.** —*Authors' abstract.*

INSTRUMENT CARRIERS

See also: **Satellite obs.,** 11.1–2; **Rocket symposia,** 11.1–7; **Sounding rockets** (Newell et al.), 11.1–14; **Optical satellite obs.** (Abbott), 11.1–107; **Satellite tracking** (Gulledge et al.), 11.1–108; **Radio satellite obs.** (Warwick), 11.1–109; **Soviet satellites,** 11.1–110; **Satellite tracking** (Klee), 11.1–111; **Mobile temp. instruments** (Quitt), 11.1–150.

11.1–153 551.507.321.2:551.507.362.1

Kehlet, Alan B. and Patterson, Herbert G. (*both, Langley Res. Center, Langley Field, Va.*), **Free-flight test of a technique for inflating an NASA 12-foot diameter sphere at high altitudes.** *U. S. National Aeronautics and Space Administration, NASA Memo* 2-5-59L, Jan. **1959.** 18 p. 7 figs., 3 refs. **DWB** (629.1388 U584me)—A free-flight test has been conducted to check a technique for inflating an NASA 12-foot-diameter inflatable sphere at high altitudes. Flight records indicated that the nose section was successfully separated from the booster rocket, that the sphere was ejected, and that the nose section was jettisoned from the fully inflated sphere. On the basis of preflight records, it is believed that the sphere was fully inflated by the time of peak altitude (239,000 ft). Calculations showed that during descent, jettison of the nose section occurred above an altitude of 150,000 ft. The inflatable sphere was estimated to start to deform during descent at an altitude of about 120,000 ft. *Subject Headings:* **1. Upper atmosphere wind measurement techniques 2. Rocket-borne balloons 3. Balloon launching from rockets.**—*Authors' abstract.* Ⓢ.

11.1–154 551.507.321.2:551.508.85

Raftery, T. J. and Plagge, H. J., **Survey of fast-rising balloons and rawin reflectors.** *Sandia Corporation, Albuquerque, New Mexico, Technical Memorandum,* 142-57-52, June 24, **1957.** 9 p. 2 tables. **DWB** (M(055) S217t)—In order to determine which rising balloons and radar reflectors are best suited for Sandia Corporation requirements and other meteorological purposes, experiments were made with the Dewey and Almy J9-15-500 balloons and rawin reflectors. The result of this investigation showed that the most reliable, as of now, is the 500-gram balloon for meteorological observations and the dipole reflectors for rawin records. *Subject Headings:* **1. Balloon comparisons 2. Rawin reflectors.**—*N. N.*

11.1–155 629.132.1:551.507.321.2

†Ross, Malcolm D. (*ONR*) and Lewis, M. Lee (*Winzen Research Inc.*), **The role of manned balloons in the exploration of space.** *Aero/Space Engineering,* N. Y., 17(8):45–52 and 56,

Aug. 1958. 3 figs., 6 tables, 31 refs. DLC—Condensation of paper read before the Meteorology Session held in cooperation with the American Meteorological Society at the IAS 26th Annual Meeting, New York, Jan. 27–30, 1958. The paper includes a review of research made in the last 175 years with balloons flights and considers manned balloon laboratories as forerunners for vehicular space travel and space observatories. The several tables given include: (1) Summary of balloon flights using sealed cabin systems; (2) Summary of stratospheric flights conducted under Navy Strato-Lab Program; (3) Partial climatic data from Strato-Lab No. 2 Flight on Oct. 18, 1957; (4) Sky brightness measurements with Luckiesh-Taylor brightness meter at an altitude of 85,400 ft; (5) Illumination observations with Weston II exposure meter and (6) Rotation and tilt of gondola in respect to sun spot movement on instrument panel. *Subject Headings:* **1. Manned balloons 2. Balloon flight observations.**—*W.N.*

11.1–156 551.507.321.2:551.508.822

Väisälä, Vilho (*Inst. of Met., Univ. of Helsinki*), **Some features of aerological soundings dependent on instrument weight.** *Geophysica*, Helsinki, 6(3/4):597–606, **1958.** 3 tables, 2 refs., 37 eqs. **DWB, DLC.** Also issued as *Helsinki. Universitet Meteorologiska Institutet, Mitteilungen*, No. 85, **1958. DWB**—In this paper a study is made concerning the influence of increasing instrument weight upon the hydrogen consumption and the size of balloons at aerological soundings. *Subject Headings:* **1. Aerological soundings 2. Radiosonde balloons 3. Instrument weight increase influence on aerological soundings.**—*Author's abstract.*

11.1–157 551.507.321.2

Wagner, W. C. and Doherty, F. X., **Device for lowering loads from high-altitude balloons.** *U. S. Air Force. Cambridge Research Center, Instrumentation for Geophysics and Astrophysics*, No. 8, July **1958.** 16 p. 10 figs. (incl. photos), 2 eqs. **DLC**—A device for lowering loads from high-altitude balloons has been developed under Project 6665 "Balloon Components," a project for the development of techniques and experimental models of equipment which will make the large plastic balloon a more versatile and useful vehicle for the United States Air Force. This device has successfully met a requirement for a particular application to lower a 600-lb instrumented package to a distance of 500 ft below an ascending balloon. A 20-min. lowering time was allowed with the restriction that shock loading be no greater than 3 g's. The device developed is of such a nature that through simple design modifications, it can very readily be adapted to accommodate different combinations of load, length of line, and time periods of lowering. With the automatic decrease in torque as line is deployed and consequently the decrease in speed of lowering as torque decreases, shock-loading effects are virtually eliminated. Thus the device is ideally suited for the lowering of payloads, such as delicate instruments, from a flying balloon. *Subject Headings:* **1. High altitude balloons 2. Balloon loads.**—*Authors' abstract.*

11.1–158 551.507.362.1:551.510.53:541.14

Aschenbrand, Leonard M. (*GRD, A. F. Cambridge Research Center*), **Projekt Leuchtkäfer.** [Project Firefly.] *Umschau*, Frankfurt a.M., 58(13):390–392, July 1, **1958.** 5 photos. **DLC** (DK 551.593)—Project Firefly of the Geophysics Research Directorate investigates the photochemical and physical properties of the upper atmosphere by releasing from rockets definite quantities of chemical substances at given altitudes. Aerosol rockets capable of carrying a payload of 67 kg up to 250 km are used. The first experiment was in 1955. Sodium was released at twilight between 75–100 km while the sun still illuminated the upper atmosphere. The spectrum showed the yellow Na-D line in the tail of the gas above 90 km altitude. Below this height the D-line did not appear. At night the D-line was visible in the long lived peak intensities at 65, 110 and 140 km. A night release of nitrous oxide at a height of 106 km showed an intense glow having an initial intensity of −2, i.e. the magnitude of Venus at the same season (March). The luminosity decreased gradually. In investigating the vertical distribution of atomic substances equal amounts of nitrous oxide gas were released at 95, 120 and 140 km. The glow at the highest altitude was greater than at the middle altitude and was equal to that at the lowest altitude. Photographs showing the experimental effects are presented. *Subject Headings:* **1. Project Firefly 2. Upper atmosphere physics 3. Rocket exploration of upper atmosphere 4. Photochemical reactions in upper atmosphere.**—*I.L.D.*

INSTRUMENTS

See also: **Met. instrument catalogs,** 11.1–34; **Met. instruments and obs.** (Petit), 11.1–35; **Antarctic weather forecasting** (Lanterman), 11.1–56; **Agromet. instruments** (Uhlíř), 11.1–118; **Radar sferics** (Atlas), 11.1–144; **Mobile temp. instruments** (Quitt), 11.1–150; **Rawin reflectors** (Raftery, Plagge), 11.1–154; **Instrument weight influence on aerological soundings** (Väisälä), 11.1–156; **Radiation effects on thermocouples** (de Percin), 11.1–218; **Elec. field meters,** 11.1–311.

11.1–159 551.508.51

*†Barthelt, H. P. and Ruppersberg, G. H., **Die mechanische Windfahne, eine theoretische und experimentelle Untersuchung.** [The mechanical wind vane, a theoretical and experimental study.] *Beiträge zur Physik der Atmosphäre,* Frankfurt a.M., 29(3):154–185, **1957.** 18 figs., 8 tables, 9 refs. German, English and French summaries p. 154. Also: **Pt. 2.** *Ibid.,* 31(3/4):262–276, **1959.** 11 figs., 3 tables, 5 refs., 25 eqs. German, English and French summaries p. 262. **DWB, DLC**—The first paper deals with the behavior of a single-axial wind vane of general construction. The behavior of the wind vane is described by a simple expression for the directional moment. The sensitivity of response and accuracy of setting result from it as parameters of practical importance. The dynamical behavior is mainly described by the so-called quality of system, a system constant which essentially is given by the type of the wings. Thus hints are obtained for the construction of systems with high resolving power with respect to time, and it is possible to make statements concerning the limits of the resolving power which can be attained with weather-resistant mechanical wind vanes. The results of measurements in the wind tunnel fit in well with the theory. Deviations are only observed when the wind vane is self-excited. A general criterion for self-excitation cannot be given, but it can be shown how (for a certain type of system) the self-excitation can be avoided without diminishing the quality of system. Pt. II discusses a biaxial wind vane which is used for the continuous registration of wind direction, inclination, and velocity. The disturbing influences of moments, atmospheric precipitation, and instantaneous lateral wind are investigated, and the construction of the wind vane is described. The results of the study of the wind vane in the wind tunnel are discussed and compared with the results of an earlier theoretical and experimental investigation of wind vanes of general construction. The question of the most favorable damping of a wind vane is considered with the aid of a model experiment. *Subject Heading:* **1. Wind vanes.**—*Authors' summaries.*

11.1–160 551.508.57

du Toit, P. S., **The Finnish radio theodolite.** *South Africa. Weather Bureau, News Letter,* No. 103:8–10, Oct. 31, **1957. DWB**—Since August 1957, upper winds have been obtained at Marion Island and since September at Swakopmund (S. W. Africa) by use of the Finnish radio theodolite. Details of its use and computation are set forth. Base lines on Marion Island could be only 5 wave lengths (60 m) instead of 10 as recommended, resulting in some inaccuracy. However, comparison with optical theodolite measurements made simultaneously at both stations as shown in tables indicate reasonable accuracy. *Subject Headings:* **1. Finnish radio theodolites 2. Marion Island 3. Swakopmund, S. W. Africa.** —*M.R.*

11.1–161 551.508.59:551.554

Vehrencamp, J. E. (*North American Instruments, Inc., Altadena, Calif.*), **Drag recorder—University of California, Los Angeles.** (In: Lettau, H. H. and Davidson, Ben. (*eds.*), **Exploring the atmosphere's first mile.** N. Y., Pergamon Press, **1957.** Vol. 1:104–113. 7 figs., 3 refs.) **DWB**—Describes the construction and operation of the automatic controller which regulates the position of the floating shallow pan containing a replica of the local terrain and which is part of the shear stress measuring system of the University of California. The procedure for the static and dynamic calibration is outlined and a graph showing the dynamic response of the stress meter is presented. The average shear stress data which are presented in Vol. 2 are described; graphs showing the shear stress fluctuations are included; and an error analysis of shear stress measurements is presented. *Subject Heading:* **1. Shear stress meters.** *I.L.D.*

11.1–162 551.508.77

Bhattacharya, J. C.; Shrivastava, G. P. et al. (*all, Met. Office, Poona*), **An electronic device for use with the tipping bucket type of distant recording intensity raingauge.** *Indian Journal of Meteorology and Geophysics*, Delhi, 9(4):402, Oct. **1958.** fig. **DWB, DLC**—A few stations in India use the distant recording intensity rain gage with a tipping bucket and a Bibby-type impulse recorder. An electronic device for use with the tipping bucket is described. *Subject Heading:* **1. Recording rain gages. I. Venkiteshwaran, E. P.**

11.1–163 551.508.77

*Poncelet, L. (*Royal Met. Inst. of Belgium*), **Sur le comportement des pluviomètres.** [The behavior of rain gages.] *Belgium. Institut Royal Météorologique, Publications, Ser. A*, No. 10, **1959.** 58 p. 10 figs., 38 tables, 6 refs. **DLC**—Study of the results of simultaneous rainfall measurements obtained with various types of rain gages. The data are principally for the years 1955, 1956 and 1957 at Uccle (Belgium) and Yangambi (Belgian Congo). At Uccle, measurements were made with 11 rain gages: 3 rain gages of the Royal Meteorological Institute (I.R.M.), recent type; 2 I.R.M. rain gages, earlier type; 2 British M.O. rain gages, 8 in. type; 2 French Association type rain gages, and 2 German Hellmann type rain gages. Descriptions of environment and instruments are given. Author determines the yearly and monthly reduction factors making it possible to convert readings from one type of rain gage to another. He believes the period of observation required for determining reduction factors to 1% should cover at least five years. For the measurements made at Uccle, author investigates more particularly the effects of wind and of sunshine after rainfall, the variation of the factors according to the continuous or intermittent character of rain, the influence of wind direction and of environment. Variation of these factors according to importance of daily rainfall amounts, behavior of the factors during snowfall and the results obtained with various types of shields are likewise surveyed. For Yangambi, author considers the effect of the Nipher shield on the measurement of rain, and the measurements obtained by means of a standard rain gage with 1 m^2 aperture. Conclusions are drawn about the comparison methods of rain gages. Factors for an isolated year vary according to the pluviometric conditions peculiar to that year. Environmental conditions favorable for comparing rain gages are, in fact, the same as those required for good pluviometric measurements. Presence of the Nipher shield, or any other shield, generally improves the accuracy of rain gages. Aerodynamic efficiency of a shield, excellent in the case of liquid precipitation, can become mediocre in the case of solid precipitation, and conversely. It seems that, when resorting to suitable conditions, determination of the yearly true amount of precipitation may be made to 1% accuracy for liquid precipitation and to 2 to 3% for solid precipitation (snowflakes) if measurements are made every day and if effects of environment are negligible. *Subject Headings:* **1. Rain gage comparison 2. Uccle, Belgium 3. Yangambi, Belgian Congo.**—*A. V.*

11.1–164 551.508.79:551.579.5

Hacia, H. (*Lab. of Climatology, Centerton, N. J.*), **Soil moisture tension—Johns Hopkins University.** (In: Lettau, H. H. and Davidson, Ben. (*eds.*), **Exploring the atmosphere's first mile.** N. Y., Pergamon Press, **1957.** Vol. 1:50–57. 4 figs., 10 refs.) **DWB**—The method of moisture tension measurement for determining soil moisture content is presented. The principle of the tensiometer and the conversion of tensiometer data to moisture percentage are discussed and a diagram of a commercially available Lark tensiometer is presented. The operation of the tensiometer at O'Neill is described and the results of various readings are analyzed and presented in graphs (tables are in Vol. II). *Subject Headings:* **1. Soil moisture determinations 2. Tensiometers.**—*I.L.D.*

11.1–165 551.508.821

Dauvillier, A. and Schwob, Y. (*Pic du Midi Obs. and S.P.A. Lannemezan*), **Un météorographe enregistreur multiple.** [A multiple meteorograph recorder.] *Journal Scientifique de la Météorologie*, Paris, 10(40):149–155, Oct./Dec. **1958.** 5 figs. French, English and Spanish summaries p. 149. **DWB**—This instrument, operating for the last ten years at the Pic du Midi Observatory is essentially a multiple multicurve variometer (using a microammeter)

with colored tracings. The detection features used are: 1) Pressure: an absolute mercury barometer, fitted with a plunger resistor; 2) Temperature: a double bolometer with commercial regulators; 3) Moisture: a hygrometer with semipermeable diaphragm, connected with a differential mercury manometer; 4) Radiation: a double bolometer with commercial carbon filament lamp components; 5) Actinometry: selenium cells provided with selective filters. *Subject Headings:* **1. Graphical recording meteorographs 2. Pic du Midi Observatory, France.** —*Authors' abstract.*

11.1–166 551.508.822

Jensen, Ansgar (*Danish Met. Inst., Copenhagen*), **Correction of radiosonde measurements for lag error.** *Geophysica*, Helsinki, 6(3/4):275–279, **1958.** table, 6 eqs. **DWB, DLC**—A table is presented (and the equations developed) for correcting radiosonde pressure observations for lag errors, temp. and humidity from 1000 mb to 50 mb. The slow response of the thermometer element is compensated by correcting the pressure values to indicate the proper level of the instrument when the given temp. was encountered. Corrections are not recommended for levels above 100 mb in view of the inherent inaccuracy of the pressure readings at those heights. No such correction is satisfactory for the reduced intensity of an inversion produced by this lag, but graphical methods of reducing the error in inversions are suggested. Errors are, in most cases, <5% and maximum errors 10%. *Subject Heading:* **1. Radiosonde lag error.**—*M.R.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Met. analysis** (Watanabe), 11.1–15; **Statistical forecasting** (Lorenz), 11.1–23; **Forecasting the freezing of rivers** (Makarevich), 11.1–24; **Avalanche forecasting** (Tushinskiĭ), 11.1–36; **Synoptic charts of hurricanes** (U. S. W. B.), 11.1–37; **Meridional cross sections** (Bugaev), 11.1–57; **Upper air wind forecasts** (Graham), 11.1–113; **Synoptic studies, Kerguelen** (Gilbert et al.), 11.1–212.

11.1–167 551.509.325:551.575.1(74)

§George, J. J., **The prediction of very low ceiling and fogs.** Eastern Air Lines, Inc., Met. Dept., Contract AF 19(604)-2073, Scientific Report, No. 1, April **1958.** p. 44–141. 69 figs., 2 tables. **DWB** (M09.318 E13sc)—Fog areas treated in this paper are relatively large ones of the order of size of the State of South Carolina. The climatology of such large fog areas is explored for the U. S. east of the 105th meridian. General causes for the formation and maintenance of such fog areas are discussed and prediction methods developed. The relationship of vertical structure of temperature and humidity to fog areas is studied. The use of radiosondes as predictors of fog formation and fog clearing is developed. Finally, the area is divided into seven reasonably homogeneous regions (according to fog cause and behavior), and each region is analyzed separately as to usual synoptic patterns, and local peculiarities in the prediction of fog. *Subject Headings:* **1. Fog forecasting 2. Fog formation 3. Fog climatology 4. Eastern United States.**—*Author's abstract.*

11.1–168 551.509.25:551.509.317:551.510.53

Kochanski, Adam, **Structure and analysis of the lower stratosphere.** (In: American Meteorological Society, District of Columbia Branch, **Proceedings of the Workshop on Stratospheric Analysis and Forecasting, Feb. 1–3, 1956.** pub. **1956.** p. 44–57. 10 figs., 4 tables.) **DWB**—The problem of analysis and forecasting in the middle stratosphere (50,000–120,000 ft) and lower stratosphere (30,000–50,000 ft) is examined on the basis of data on daily winds and temperatures obtained by the Signal Corps Engineering Laboratories in 1954. Data on daily winds at Belmar, N. J. in Aug. and Jan. 1956 and average 24-hr and 48-hr vector changes and mean scalar wind speed are presented and it is shown that larger vector variations of the wind appear with larger scalar speeds and vice versa, "regardless of whether this is in the westerlies or easterlies, at lower levels or very high levels, in summer or in winter." The use of persistence as a forecast tool in the middle stratosphere is indicated. In the lower

stratosphere, where map analysis is feasible, analytic and prognostic wind fields are represented by means of a contour map supplemented by an isotach field. The advantages for using the thickness method are outlined and thickness patterns for different layers (500–300 mb, 300–200 mb and 200–100 mb) in winter and summer are analyzed with the aid of charts showing the temperature gradients. The value of the objective upstream technique in forecasting wind speed at high levels is discussed on the basis of a small sample (61 cases). The subjective forecasting technique at 300, 200 and 100 mb is outlined. *Subject Headings:* **1. Stratospheric wind forecasting 2. Stratospheric temperature forecasting 3. Synoptic analysis.**—*I.L.D.*

11.1–169 551.509.25:551.509.312

Palmieri, Sabino, **Sulla preparazione di topografie a 500 mb, previste per 48 ore, mediante integrazioni grafiche.** [Preparation of 500 mb prognostic contour charts for 48 hours, by means of graphical integration.] *Rivista di Meteorologia Aeronautica*, Rome, 18(4):3–11, Oct./Dec. **1958.** 5 figs., table, 5 refs., 12 eqs. Italian, French, English and German summaries p. 3. **DWB**—The results of a set of prognostic 500 mb charts, with 48 hours validity, analyzed by means of graphical integrations after the Fjørtoft-Estoque method, are discussed. A systematic defect in the advection field is pointed out, and a slight change in the smoothing process, giving better results, is suggested. *Subject Headings:* **1. Graphical forecasting methods 2. Fjørtoft's graphical method 3. 500 mb prognostic charts.**—*Author's abstract.*

11.1–170 551.509.314:519.24

Magata, M.; Ozawa, T. et al. (*all, Met. Res. Inst., Tokyo*), **On the correlation fields and the predicting possibilities by statistical methods at 500 mb level.** *Papers in Meteorology and Geophysics*, Tokyo, 8(4):245–270, Jan. **1958.** 13 figs., 3 tables, 8 refs., 18 eqs. **DWB**—Cross correlation coefficients between the 500 mb contour height at about 50°N 140°E and those at the 25 points in its vicinity, were calculated from the data of the Januaries 1948–1952 and the features of the correlation fields were investigated. The contour heights at the several points having relatively stable correlation were selected as predictors and the 24-hour predictions of the 500 mb contour height at about 50°N 140°E were performed by the linear regression method. When time lag τ is relatively large, the correlation coefficients at the above 25 points became small and unstable, and so cross correlation coefficients of lag 1–10 days between the 500 mb contour height at about 50°N 140°E and those at many points over the Northern Hemisphere were calculated and the behavior of the distributions of correlation coefficients were discussed. At the same time, the theoretical correlation field was obtained from the linearized vorticity equation and compared with the actual correlation fields, and the features of the correlation field were discussed by the method of spectrum analysis. Some considerations on the nonlinear system were also made. *Subject Headings:* **1. Correlation field pattern charts 2. Statistical forecasting 3. Contour height data. I. Suzuki, E. II. Fujita, T. III. Tomatsu, K.**—*Authors' abstract.*

11.1–171 551.509.33

Massachusetts Institute of Technology, **Extended forecasting research project.** Contract Cwb-9232, Final Report, July 1, 1957–June 30, 1958. June 30, **1958.** 14 p. Carbon of typescript. **DWB** (M09.3 M414r)—The study of the degree and shape of the reactions of the atmospheric circulation and corresponding weather patterns to irregular solar activity, temporarily discontinued, has been reinaugurated with financial support from the National Science Foundation and from the Geophysics Research Directorate. The study aims at utilizing results as a basis for extended and long range weather forecasting. For effective research on the project, the study is divided into three subdivisions. The summary of the status of the Weather Bureau project investigations now in progress includes the five-day mean maps, profiles, circulation indices, correlation coefficients, and current monthly and seasonal world weather analyses. This report also contains the study of solar-weather relationships, operational, monthly and seasonal forecasting, complementary investigations of the G.R.D. and N.S.F. projects, as well as some further work planned for the extended forecasting project. *Subject Headings:* **1. Extended forecasting 2. Long range forecasting 3. Solar-weather relationships. I. Willett, Hurd C.**—*N.N.*

11.1–172 551.509.311:551.515.11(262)

George, J. J., **An aid to forecasting weather in the Mediterranean Sea.** *U. S. Navy Weather Research Facility, Task* 13, *Research Report* (unnumbered), Sept. **1958.** 42 p. figs. **DWB** (M09.3 U5854ai)—A brief review and some new data are given on the problem of forecasting cyclogenesis in the Mediterranean. A prediction method is devised for forecasting repeated cyclogenesis using the appearance of new minor troughs and the characteristics of the current at the inflection point in the major northwest current. Three techniques are presented for predicting the 24-hr movement of cyclones in this area, each one having its own class of synoptic cases for which it should be used. One of these techniques simply uses a measure of wind speed and direction in a given area at 500 mb above the surface low center. The other two have to do with the movement and characteristics of the northwest or northerly current at the point of inflection. A general method of predicting good or bad weather in the area is developed and described using the orientation, speed and fetch of major 500 mb currents. A general synoptic climatology for the Mediterranean is presented. *Subject Headings:* **1. Cyclogenesis forecasting 2. Forecasting techniques 3. Mediterranean Sea.**—*Author's abstract.*

11.1–173 551.509.311:551.515.2

Hoover, Robert A. (*U. S. W. B. Forecast Center, Wash. Natl. Airport, Wash., D. C.*), **Empirical relationships of the central pressures in hurricanes to the maximum surge and storm tide.** *Monthly Weather Review*, Wash., D. C., 85(5):167–174, May **1957.** 9 figs., 2 tables, 5 refs., 3 eqs. **DWB**—Regression lines are presented for use in forecasting maximum surge and storm tide in hurricanes, on the basis of central pressure. Hurricanes are divided according to whether they struck the Gulf Coast (24 cases) or Atlantic Coast (18 cases). Surge profiles for "Ione" (September 1955) and "Carol" (August 1954) for the coastal areas of North Carolina and Cape Cod, respectively (two other hurricanes are similarly analyzed: September 14, 1944 at Cape Cod, and Aug. 11, 1940 near Savannah), and observed, predicted and meteorologic tides for Norfolk for "Connie" (August 1955) are presented by way of illustration, along with other basic data. *Subject Headings:* **1. Hurricane surge forecasting 2. Hurricane analysis.** —*M.R.*

11.1–174 551.509.318:517.947

Mashkovich, S. A., **K uchetu effekta nelineĭnykh chlenov uravneniĭ pri reshenii zadachi o prognoze davleniia i temperatury maloĭ zablagovremennosti.** [Calculating the effect of nonlinear terms in equations for the solution of the problems of short range forecasting of pressure and temperature.] *Moscow. Tsentral' nyĭ Institut Prognozov, Trudy*, No. 60:22–31, **1957.** 4 figs., 6 refs., 24 eqs. **DWB** (M(055) U581tts)—In the investigation of large scale atmospheric processes, systems of nonlinear equations are employed. In view of the difficulty of their solution they are replaced by linearized equations which may, however, introduce considerable errors. The determination of the effect of nonlinear terms of the equation was carried out in two directions. The first involved the gradual specification of the "fundamental state" which is described by the distribution of velocity (or pressure); the velocity of the zonal circulation V_λ being given by the formula $\overline{V}_\lambda = \alpha a \sin\theta$ (α = circulation index, a = radius of earth, $\theta = \pi/2 - \varphi$, φ = geographic latitude). The second approach consists of two ways of determining directly the effect of nonlinear terms, namely the use of the method of successive approximations and the solution of the problem by EULER's method. The application of the former method to the forecast pattern for a mean (nondivergent) trend is illustrated and the solutions of the relevant equations, both for the method of successive approximation and EULER's method, are presented. Also the discussion includes the use of a model of a polytropic atmosphere to forecast surface pressure and absolute topography by means of electronic calculation and the equation

$$\frac{\partial H_1}{\partial t} = \int_s\int \left\{ \overline{M_1}\left[\frac{g}{l}(H_1 \Delta H_1) + \beta \frac{\partial H_1}{\partial x}\right] + \overline{\overline{M_1}}\left[\frac{g}{l}(H_2, \Delta H_2) + \beta \frac{\partial H_2}{\partial x}\right] + M_2(H_1, H_2)\right\} ds$$

where H_1 and H_2 = geopotentials of two isobaric surfaces; $\overline{M}_1$, $\overline{\overline{M}}_1$, and $\overline{M}_2$ depend only upon horizontal coordinates. *Subject Headings:* **1. Short-range forecasting 2. Linear equations 3. Numerical forecasting techniques.**—*I.L.D.*

11.1–175 551.509.318:551.577:551.571.1(571)

Orlova, V. V., **Osobennosti vlagooborota Zapadnoĭ Sibiri vo vlazhnye i zasushlivye iesiatsy.** [Pecularities of the moisture balance of western Siberia during humid and arid ionths.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* No. 62(124):52–61, 956. fig., 6 tables, 4 refs. **DLC**—A detailed report on the study of moisture balance made y comparing the very rainy April 1952 (precipitation 150–200% above normal) and the less umid June 1953 (precipitation 120–150% above normal) with the dry and warm April and une 1951 using synoptic surface charts and 850,700 and 500 mb charts. The origin of rain-orming air masses was determined by the construction of air trajectories for every case of ainfall. The results of the analysis, which show an increase of recurrence of air mass outflow rom the Atlantic and an increase of moisture content in the humid months, are discussed ith the aid of numerous graphs and tables. *Subject Headings:* **1. Synoptic analysis 2. Synptic conditions for rainfall 3. Moisture balance 4. Western Siberia.**—*A.M.P.*

WEATHER MODIFICATION

11.1–176 551.509.6(73)

Bell, G., **Bericht über den Stand der Wetterbeeinflussung in den Vereinigten Staaten on Amerika.** [Report on the present status of weather control in the U. S.] *Meteorologische undschau,* Berlin, 11(6):185–187, Nov./Dec. **1958. DWB, DLC**—The conditions in the . S. leading to the establishment of the Advisory Committee on Weather Control in 1953, ie task of the Committee and the most important conclusions reached in the **Final report** 1957, are summarized briefly. The membership of the Committee is listed. The author ien presents a translation of the summary of the results and of the recommendations for genral meteorological research. *Subject Headings:* **1. Weather control in U. S. 2. United States.** *-I.L.D.*

11.1–177 551.509.6

Schaefer, V. J.; Vonnegut, B. et al., **The future [of weather control].** (In: U. S. Advisory ommittee on Weather Control, **Final Report, 1957.** 2:201–207.) **DWB, DLC**—The authors resent an overall survey of the problem of weather control as a continuing research problem nvolving scientific techniques and knowledge but also financial support, scientific personnel nd planning. The discussion includes the following: possible methods of weather control, ncluding cloud, dry ice and water seeding, altering the radiation and the water balance of the arth, etc.; inadvertent weather modification such as man made smoke; undesirable effects f weather control; obstacles to the evaluation and development of weather control; future of ieteorology to attract its share of scientific talent; need for federal support and for the diersification of sponsorship of research; stabilization and continuity of research; selection of esearch problems and some of the various problems that need research (cause of tornadoes, ectrification in clouds, etc.); the establishment of a favorable environment for research, ncluding interdisciplinary cooperation, the planning and execution of small scale, flexible nstruments and interchange of information. An outline of suggestions for further research on eather control is presented: possible studies on freezing nucleation, on condensation nuclei evelopment of hydrometeors, dynamics of clouds and large scale interrelationships; cloud ensus; atmospheric electricity and applied cloud seeding developments. *Subject Headings:* **Weather control. I. Barrows, J. S. II. MacCready, P. B., Jr.**—*I.L.D.*

11.1–178 551.509.6

Schaefer, Vincent J., **Introduction and summary.** (In: U. S. Advisory Committee on Veather Control, **Final Report, 1957.** 2:99–104.) **DWB, DLC**—In this introductory paper, he author briefly discusses the present state of knowledge on weather modification and then ummarizes the results of the various projects on weather modification undertaken under the ispices of the Advisory Committee on Weather Control. These projects are: Project Overed; Project Sailplane, Montana, 1956; Project Seabreeze, 1956; Pasadena Conference on Ice uclei Measurements; Santa Barbara Project; Seabreeze 1957; the Mount Whittington roject; and Project Skyfire 1957. Also the results of the physical evaluation program, the nowledge gained on the value and efficiency of various types of equipment, small scale projects nd techniques and the results of studies on AgI plume tracing, AgI deactivation, "over-

seeding" cloud electrification, etc. are summarized. *Subject Heading:* **1. Weather modification** —*I.L.D.*

11.1–179 551.509.616:551.596.5

Uchida, E. (*Met. Res. Inst., Tokyo*), **On the beginning times of thunders in the cloud seeding experiments.** *Papers in Meteorology and Geophysics*, Tokyo, 8(4):282–291, Jan **1958.** 4 figs., 3 tables, 12 refs., 2 eqs. **DWB**—It was found (during August 1952 cloud seeding tests in the Kanto and Chubu Districts of Japan) that thunder was apt to break out in succession towards the leeward along the path of the drifting silver iodide smoke in cloud seeding experiments and some explanation for it was attempted in the light of recent knowledge of thunderstorms (1951–1956 data). The height and temperature of the level at which the top of the smoke reached cumulonimbus clouds and the process of the outbreak of thunder after the arrival of the smoke in the clouds were discussed. *Subject Headings:* **1. Cloud seeding effects 2. Thunder during cloud seeding.**—*Author's abstract.*

11.1–180 551.509.617

Barton, Manes and Calvin, Lyle D., **Evaluation of cloud-seeding efforts in the southern Oregon cascades, 1952–1957.** *Western Snow Conference, April 1958, Proceedings*, 26:66–73 Oct. **1958.** 4 figs., 6 tables, 7 refs. **DWB** (M(06) W527p)—For seven years (1952–1958) the North American Weather Consultants have conducted cloud seeding operations for the California Oregon Power Company in order to increase the mountain snowfall and consequently the summer stream flow for the production of hydroelectric power. During these years there has been a noticeable increase percent-wise in the average snow water content, the precipitation and the streamflow. The highest percent of normal precipitation during four of the seeded years occurred in the Fremont-Paisley area. This strongly supports the thesis that a down-wind effect exists beyond the target area. *Subject Headings:* **1. Cloud seeding evaluation 2. Cloud seeding in Oregon.**—*N.N.*

11.1–181 551.509.617

Day, John A. (*Dept. of Physics, Univ. of Redlands, Calif.*), **Cloud seeding: hope or hoax?** *Water and Sewage Works*, San Marino, Calif., 105(5):207–209, May **1958. DLC**—A popular lecture reviewing the history of rainmaking (scientific and pseudo-scientific) throughout recent centuries and the possibilities of present techniques paying off or being consciously or unconsciously a "hoax." Promises and evaluations may both be influenced by subjective judgment, especially where profits are concerned. Ignorance also plays a part. Future lies in research and better understanding. *Subject Heading:* **1. Cloud seeding potentialities.**—*M.R.*

11.1–182 551.509.616:551.578.7

Frank, Sidney R., **Survey and history of hail-suppression operations in the United States.** (In: U. S. Advisory Committee on Weather Control, **Final Report, 1957.** 2:264–272. 2 figs. 4 tables.) **DWB, DLC**—The basic concept in hail suppression is the assumption that by the introduction of sufficient nuclei into a potentially hail producing system "the cloud droplets would have limited growth and precipitate out in the form of many showers of small drop and/or hail size rather than a few showers of large drop and/or hail size." The author discusses the growth of hail suppression projects during the period 1949–1956, the evaluation techniques such as the financial approach used by commercial operators, the use of regression equations and hail insurance statistics and the comparative efficiency and value of the procedures for hail suppression employed, namely: ground based generators only, aircraft generators only and ground and aircraft generators. A chronology of hail suppression in the United States during the period 1949–1957 and an outline of hail suppression activities outside the U. S. (France, Switzerland, North and South Africa, etc.) are given. The appendix contains a paper by R. Sanger on the **Swiss Federal Commission for the Study of Hail Formation and Prevention** which deals primarily with the third large scale experiment to prevent hail in Tessin, Switzerland, during 1957 and 1958. The contents of this paper are as follows: Mathematical-statistical interpretation of results including a description of the experimental set-up duration of the experiment, experimental unit, and statistical evaluation; the actual measures taken by the organization committee and conduct of the third large scale experiment and the utilization of crop-hail insurance statistics as a measure of hail suppression efficacy (based

pon excerpts from a paper by R. J. Roth). A map showing the location of the silver iodide enerator stations in Switzerland, and a table with their heights above sea level are presented. *ubject Headings:* 1. **Hail suppression** 2. **Hail presentation** 3. **United States.**—*I.L.D.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

ATMOSPHERIC COMPOSITION

See: **Instruments for CO_2 meas.** (Uhlíř), 11.1-118; **Upper air density variance** (Mook), 11.1-233.

ATMOSPHERIC POLLUTION

See: **Stack effluent diffusion** (Hilst), 11.1-201.

STRUCTURE OF THE ATMOSPHERE

11.1-183 551.510.5:551.589(661)

*French West Africa. Service Météorologique, **Troposphère et basse stratosphère en frique Occidentale: statistiques climatologiques.** [Troposphere and low stratosphere in Vest Africa: climatological statistics.] Jan. **1959.** 57 p. 4 charts, numerous tables. limeo. **DWB** (M06.1/661 F873tr)—Radiosonde or radiowind observations were made at akar by the U. S. Army in Dec. 1943 and from March 1944–Oct. 1945 and by the meteoro-gical service of French West Africa (A.O.F.) from March 1947; at Niamey since June 1950, at ort Trinquet since 1951, Abidjan since Sept. 1953, Bamako, June 1957 and Conakry, July 957–Oct. 1958. During the first year the observations were irregular and averaged 15 km. ecently they have been more regular and averaged 20 km. Up to 1952 the U. S. AN/AMG-1, endix Friez radiosonde was used at Dakar and Niamey. Since then the French Metox adiosonde has been used uniformly. Detailed data (including tropopause, 0° and −10° otherm and wind frequencies, means and extremes are given in tables. Charts show zonal mponents of the wind up to 40 mb. for the course of the year at 3 stations. *Subject Headings:* **Upper air data summaries, West Africa 2. Tropopause data 3. Zero isotherm data Zonal wind component data 5. West Africa.**—*M.R.*

11.1-184 551.510.528:551.513:551.557.5

†Defant, Friedrich (*Univ. Innsbruck*; *Zentralanstalt für Met. & Geodynamik, Vienna*), **Die lgemeine atmosphärische Zirkulation in neuerer Betrachtungsweise.** [General atmospheric rculation from a new point of view.] *Geophysica*, Helsinki, 6(3/4):189–217, **1958.** 3 figs., 5 refs. German summary p. 189. **DWB, DLC**—A comprehensive synoptic study of jet ream, tropopause and zonal or meridional flow conditions during the first part of Jan. 1956 the Northern Hemisphere for the purpose of determining the interrelations between these rculation elements and the mechanism involved. The heights and temps. of the tropopause e carefully determined and shown on sounding diagrams and a statistical study is made of l tropopause levels (geopotential and temp.) on a scatter diagram to show the ranges of eight and temp. and the three main types (polar, mid-latitude and tropical) and their relation the polar and sub-tropical jet stream. Furthermore, the soundings are typed and a study ade of jet stream meanderings and attending intrusions of air toward high latitudes, and nsequent blocking. *Subject Headings:* 1. **Tropopause-jet stream relationships** 2. **General rculation studies** 3. **Winter circulation regimes.**—*M.R.*

11.1-185 551.510.528(672)

*French Equatorial Africa. Service Météorologique, **La tropopause à Bangui.** [Tropo-ause at Bangui.] Its *Publication*, No. 5, July **1958.** [17 p.] Mostly tables. **DWB** M(055) F873p)—Statistical tables give data on height, pressure, temperature and wind at e tropopause at Bangui (04°22′N, 18°34′E) from 1953–1957, inclusive, as follows: I. Mean onthly maximum, minimum and average height, pressure, temperature and mean wind eed; II. Mean monthly frequency of heights; III. Mean frequency of pressure; IV. Mean equency of temperature; and V. Mean frequency of wind direction and speed for each month.

Bangui is on the upper Congo, in eastern French Equatorial Africa. *Subject Headings:* **1. Tropopause data 2. Bangui, French Equatorial Africa.**—*M.R.*

11.1–186 551.510.528(663.2)

*French West Africa. Service Météorologique, **La tropopause à Dakar.** [Tropopause at Dakar.] Issued Aug. **1957.** [18 p.] Almost entirely tables. **DWB** (M10.52 F877t)— Tables based on 1365 radiosoundings (1953–6) at Dakar show monthly mean maximum and minimum height, pressure, temperature and wind speed at the tropopause, and the frequency distributions of tropopause height, pressure and temperature, plus wind frequencies. Tropopause heights vary from 12.6 to 19.8 km, from 59 to 188 mb and from −54 to −81°C; not only monthly but 5-day means of the 4 parameters are tabulated. These means fluctuate from 115.5 to 16.8 km (122 to 99 mb) and from −70°C to −75°C with no significant seasonal pattern except a generally lower tendency in December and January than in May or June. The variations within a month, even in these 5-day means, are greater, however, than the seasonal. *Subject Headings:* **1. Tropopause data 2. Dakar, French West Africa.**—*M.R.*

11.1–187 551.510.528:551.524.7:551.547

Kaminer, N. S., **Statisticheskie sviazi v verkhnikh sloiakh atmosfery.** [Statistical relations in the upper layers of the atmosphere.] *Meteorologiia i Gidrologiia*, Leningrad, No. 3:34–36, March **1958.** table, 3 refs., 10 eqs. **DWB, DLC**—A statistical investigation of the relationship between tropopause temperature (t_s) and pressure at the earth's surface (p_n) atmospheric temperature at the 300 mb isobar (t_{300}) and the height of this surface (H_{300}). This relationship is expressed by the regression equation $t_s = a + b_1 p_n + b_2 t_{300} + b_3 H_{300}$ and simple and multiple correlation coefficients are computed for each season on the basis of data for Sverdlovsk. The correlation coefficient decreases from winter to summer. A high correlation of 0.77 was obtained between the temperature at 200 mb with temperature at 300 mb height at 300 mb and p_n. The possibility of extrapolation with some precision in the lower stratosphere is examined by using winter aerological data. Indirect determinations of tropospheric temperature by means of a regression equation yield an error of $\sigma(t_{300}) \approx 3.5$°C. An equation is developed for reducing the error in determining tropopause temperature by extrapolation. *Subject Headings:* **1. Tropopause temperatures 2. Temperature-pressure relationships 3. Regression equations.**—*I.L.D.*

TROPOSPHERE—UPPER ATMOSPHERE—IONOSPHERE

See also: **Trop. radio wave propagation** (Battan), 11.1–11; **Magneto-ionic theory** (Ratcliffe), 11.1–17; **Ionos. radio wave propagation,** 11.1–22; **Ionospheric conditions, Arctic** (Driatskiĭ, Besprozvannaia), 11.1–53; **Project Firefly** (Aschenbrand), 11.1–158; **Analysis and forecasting in the stratosphere** (Kochanski), 11.1–168.

11.1–188 551.510.53:551.513

§Craig, Richard A. and Hering, Wayne S. (*both, Air Force Camb. Res. Center*), **Stratospheric warming of Jan.–Feb. 1957.** *Journal of Meteorology*, Boston, 16(2):91–107, April **1959.** 25 figs., 11 refs. **DWB, DLC**—The stratospheric warming of Jan.–Feb. 1957 is discussed with reference to the temperature and circulation changes which occurred. We attempt to present a concise description, rather than an explanation, of the observed sequence of events, beginning with 10 mb temperature rises in mid-January and ending with extensive circulation changes in February. *Subject Headings:* **1. Stratospheric warming, Jan.–Feb. 1957 2. Temperature changes 3. Atmospheric circulation changes.**—*Authors' abstract.*

RADIO METEOROLOGY

See also: **Radio met.** (Battan), 11.1–11; **Radio met.** (Hiser, Freseman), 11.1–12; **Radio wave propagation theories** (Ratcliffe), 11.1–17; **Refractive index variations** (Gerhardt), 11.1–221.

11.1–189 551.510.62:551.515.8

Bean, Bradford R. and Riggs, L. P., **On the synoptic variation of the radio refractive index.** *U. S. National Bureau of Standards, NBS Report*, 6034, Jan. 13, **1959.** 13 p. 30 figs.

refs., 5 eqs. **DWB** (621.384 U585ons)—The synoptic variation of the atmospheric radio ractive index, evaluated from standard weather observations, is examined during an out- eak of polar continental air. It is found that the reduced-to-sea-level value of the refractive dex is a more sensitive synoptic parameter than the station value. The reduced value is ite sensitive to the humidity and density structure of the storm under study while the great tion elevation dependence of the station value tends to mask synoptic changes. The duced value changes systematically with the approach and passage of the polar front wave. ne present system showed a consistent increase in the warm sector of the wave and a marked crease behind the cold front. *Subject Headings:* **1. Frontal effects on refractive index Refractive index variations.**—*Authors' abstract.*

RADIOACTIVITY

See also: **Radiocarbon meas., N. Atlantic and Arctic Sea** (Fonselius), 11.1–99; **Radar obs. of radioactive clouds** (Richards, Watson), 11.1–140; **Weather radar for fallout forecasting** (Austin), **11.1–146.**

11.1–190 551.510.71:550.378

†Sisigina, T. I., **Spektral'nyĭ sostav gamma-izlucheniia elementov semeĭstva urana i toriia.** pectral composition of the gamma radiation of the elements of the uranium and thorium ries.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, 12:1484–1490, **1957.** 8 tables, 19 refs. **LC**—On the basis of published data on the gamma radiation of elements of uranium and horium families, the author constructed tables of the spectral composition of the gamma diation of the elements belonging to these families. The energetic characteristics of gamma diation of elements of these families were computed and the full energy of gamma radiation r equilibrium uranium, thorium and radium was determined. The data presented may be eful in solving problems of gamma spectroscopy and investigating radioactivity of rocks. *ubject Headings:* **1. Radioactivity of rocks 2. Uranium 3. Thorium.**—*Based upon author's nclusions* (*I.L.D.*)

11.1–191 551.510.721

*Burement, W. A. S.; Dwyer, L. J. et al. (*all, Australian Weapons Safety Committee*), **adioactive fallout in Australia from Operation Buffalo.** *Australian Journal of Science*, dney, 21(3):63–78, Oct. **1958.** 2 figs., 9 tables, 7 refs. **DLC**—The code name Buffalo ands for the first series of nuclear weapons tests conducted September and October, 1956, the ultra-modern firing site Maralingo some 25 mi north of Watson, Australia. Two of the ings were from towers, one at ground level and one dropped from an air craft and fused to e above the surface of the earth. Maps feature the trajectories of the radioactive clouds id the locations of the 86 recording stations. The fallout was measured by gummed film, r filters, rain sampling, soil and water checks, as well as control of the radioiodine take up by azing cattle and sheep. Results from the gummed film method are presented in four tables, id the other tables include results from 76 stations with filtered pumps simulating human air take, rain sampling results from 13 stations and from 14 reservoirs. The individual results ow concentration values far less than permissible. *Subject Headings:* **1. Radioactive fallout ata 2. Operation Buffalo 3. Australia. I. Martin, L. H. II. Stevens, D. J. III. Titterton, . W.**—*W.N.*

11.1–192 551.510.721

Collins, William R., Jr. and Hallden, Naomi A. (*both, Health and Safety Lab., USAEC*), **study of fallout in rainfall collections from March through July 1956.** *U. S. Atomic Energy ommission, HASL* (*Health and Safety Lab.*), [*Report*] No. 42:339–354, Oct. **1958.** 5 figs., tables. **DWB** (M94.143 U581en). (Same title issued earlier as *U. S. Atomic Energy ommission,* [*Report*] *NYO*-4889, April **1957.** For abstract on this title, *see* 9C–18, March 959, *MAB.*)—A study of β activity and radiostrontium in rain water was undertaken at the ealth and Safety Laboratory (HASL) during the spring of 1956. At the time a survey of tmospheric aerosols and the elemental constituents of rainfall was being conducted by the loud Physics Section of the Air Force Cambridge Research Center. The samples from the

network of stations were analyzed by a contractor, Skinner and Sherman, of Boston, Mas HASL received a part of the total month's sample from each site if there was sufficient samp for both laboratories to run analyses. Sampling covered the period from March throu July 1956 for 61 stations within the continental United States, Bermuda, Newfoundland, a the Azores. The original purpose of the study at HASL was to correlate the amount of fallo in rainfall with the estimate of total fallout from gummed film measurements. *Subject Hea ings:* **1. Radio active rainfall 2. Radioactive fallout analysis 3. United States 4. Bermu 5. Newfoundland 6. Azores.**—*Authors' abstract.*

11.1–193 551.510.7

†Kiefer, Hans and Maushart, Rupprecht, **Die Ablagerung von Strontium 90 auf di Erdoberfläche.** [Fallout of Strontium^{90} on the earth's surface.] *Die Naturwissenschafte* Berlin, 46(3):102–104, Feb. **1959.** 4 figs., table, 14 refs. **DLC**—The different explosions atomic bombs have resulted in a relatively uniform distribution of radioactive particles in th upper layers of the atmosphere. The dominant part taken by Sr^{90} is developed. Loc fallout may produce radiation detrimental to health: Rongelap atoll and Utirik atoll. Sr has the greatest influence on animals, but there are no direct indications of its influence c man. The authors comment on the measurements of Sr^{90} carried out at the earth's surfac in the U. S. (Nevada 1956), in Great Britain (Harwell) and in Japan. For three years measur ments on the amount of Sr^{90} have been made in Germany in the Karlsruhe-Bruchsal-Pforzhei region. The results are published in two tables. *Subject Headings:* **1. Radioactive fallou 2. Strontium^{90} measurement 3. Strontium^{90} in animals.**—*A. V.*

11.1–194 551.510.72

Miyake, Y.; Sugiura, Y. et al. (*all, Met. Res. Institute, Japan*), **The estimation of th amount of Sr-90 deposition and the external infinite gamma dose in Japan due to man-mad radioactivity.** *Papers in Meteorology and Geophysics*, Tokyo, 8(3):222–231, Oct. **1957.** 5 figs 5 tables, 11 refs., 4 eqs. English summary p. 222; Japanese summary p. 231. **DWB**—Thi accumulated amount of Sr^{90} deposition and the infinite gamma ray dose due to artificial radio active substances originating from nuclear tests were calculated. The amount of Sr^{90} wa derived from the values of gross activity of rainwater and fallout which have been observe daily since May 1954. The gross activity is reduced to the value for one year after fissio and Sr^{90} content is calculated according to HUNTER-BALLOU tables. The contribution of th older fission products falling slowly from the stratosphere was taken into consideration unde a few assumptions, using the values of five years and two months as the residence time of dus particles in the stratosphere and the troposphere, respectively. Agreement among the calcu lated values by the present authors, those by U. S. Atomic Energy Commission and the ob served monthly deposition of Sr^{90} by the chemical method (by IZAWA, 1957) was fairly good The prediction of the probable level of Sr^{90} deposit in future was also given. Calculation of th infinite gamma radiation dose at a given point one meter above the ground was made takin also the stratospheric fallout into computation as above. The results of calculation are give in tables. *Subject Headings:* **1. Strontium^{90} data 2. Radioactive fallout dose calculation 3. Japan. I. Saruhashi, K. II. Kanazawa, T.**—*Authors' abstract.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Precip. intensity-stability relationships** (Keitz et al.), **11.1–152.**

11.1–195 551.511.

†Van Mieghem, Jacques (*Univ. of Brussels*), **On the interpretation of the energy equation in dynamic meteorology.** *Geophysica*, Helsinki, 6(3/4):559–576, **1958.** 20 refs., 5 eqs **DWB, DLC**—Some essential classical concepts and results are recalled. Thereafter a balanc form is given to the energy equations, allowing for the introduction of energy fluxes and rate of energy production. The local change in a fixed unit volume of any energy form may b expressed in terms of these fluxes and rates. The choice of the final form of the equations balance is justified on physical grounds. These equations are applied to the two possibl

treme cases: small scale turbulence and atmospheric disturbances at the planetary scale. *bject Heading:* **1. Energy equations.**—*Author's abstract.*

11.1–196 551.511.2:551.513

Bundgaard, R. C. (*USAF, 10th Weather Group Fuchu Air Station*), **Air power.** *Geo-ysical Magazine*, Tokyo, 29(1):37–44, Nov. **1958.** 3 figs., 7 refs. **DWB, DLC**—Normal eridional profiles of potential and kinetic energies for the Northern Hemisphere are presented. hese profiles show large seasonal surpluses and deficits the global magnitudes of which are ported. Observed annular rates of energy production and transformation are derived and e interpreted into the known processes of general circulation. *Subject Headings:* **1. Meri-onal profiles 2. Kinetic energy 3. General circulation 4. Northern Hemisphere.**—*uthor's abstract.*

11.1–197 551.511.3:551.515.21/31

Kuo, H. L. (*Mass. Inst. of Tech.*), **Dynamics of convective vortices and eye formation.** n: Bolin, Bert (*ed.*), **The atmosphere and the sea in motion.** N. Y., Rockefeller Institute ress, **1959.** p. 413–424. 3 figs., 3 tables, 13 refs., 31 eqs.) **DLC.** (Also issued in: Massa-usetts Institute of Technology. Dept. of Meteorology, Contract AF 19(604)-1000, **Final eport,** Dec. 31, **1957.** p. 243–272. 3 figs., 3 tables, 13 refs., 30 eqs.) **DWB**—The me-anics that lead to the formation of the eye in convective vortices is analyzed and the dy-amical significance of this feature in the maintenance and further development of the systems investigated by applying general integral relations expressing the conservations of absolute omentum, potential temperature and total energy. The energy integral is first rearranged, sing the law of conservation of potential temperature, in such a way as to express the change the sum of the internal and potential energies along a streamline in terms of the horizontal. hen this energy integral is combined with the integral expressing the conservation of ab-olute momentum, it is then found that there exists a limiting radius beyond which the con-erging current cannot penetrate; it must therefore turn upward and then outward at upper vels. The surface defined by this streamline id identified with the wall of the eye; it separates ne vortex into an outer and an inner region. Finally, the motion inside the eye and its ynamic significance are discussed. Since the maximum tangential velocity occurs just utside the eye, and there exists a very large horizontal shear, strong lateral mixing will ake place and the air inside the eye must be dragged into the upward and outward motion, hich reduces the pressure inside the core and in turn strengthens the converging flow. A escending motion will also be induced near the center as a result of the ascending motion ear the rim of the eye. *Subject Headings:* **1. Convective vortex theory 2. Eye formation in onvective vortices 3. Dynamics of convective vortices.**—*Author's abstract (abridged).*

11.1–198 551.511.33

Lettau, Heinz H. (*Geophysics Research Directorate*), **Computation of heat budget con-tituents of the earth/air interface.** (In: Lettau, H. H. and Davidson, Ben. (*eds.*), **Exploring he atmosphere's first mile.** N. Y., Pergamon Press, **1957.** Vol. 1:305–327. 8 figs., 6 tables, refs., 43 eqs.) **DWB**—A theoretical mathematical paper dealing with the computation of eat budget constituents of the earth/air interface. The contents of this paper are as follows: he heat budget equation of the earth/air interface and its constituents; SUOMI's model of heat udget determination; a comparison of the SUOMI and HALSTEAD models; LETTAU's model of eat budget determination; independent testing of heat transfer rates; and independent test-ng of evaporation flux data. *Subject Headings:* **1. Heat balance earth-air interface 2. Heat udget determination.**—*I.L.D.*

11.1–199 551.511.33:551.551.8

Sorkina, A. I. and Gracheva, V. P., **Opredelenie kharakteristik termicheskogo i tur-ulentnogo rezhima atmosfery nad morem.** [Determination of the characteristics of the hermal and turbulent regime of the atmosphere over the sea.] *Moscow. Gosudarstvennyĭ Okeanograficheskiĭ Institut, Trudy,* No. 38:26–33, **1957.** 3 figs., 2 tables, 4 refs. **DWB, DLC**—n calculating the velocity and direction of wind over the sea from gradient winds it is necessary

to establish the value of the parameter ϵ characterizing the degree of atmospheric stabi over the sea, the parameter z_0 = sea surface roughness, and the value of the coefficient of change over the sea. The observational material on wind velocity were obtained at differ levels over the Caspian Sea at Neftianye Kamni and over the Tsimlyansk reservoir. computation of the formulas of roughness and stability and the exchange coefficient is illustra with the aid of the appropriate equations of D. L. LAĬKHTMAN and M. P. TIMOFEEV. relationship between ϵ over the sea and the temperature difference between water and ai established and the selection of gradients corresponding to different conditions of atmosphe stratification is discussed. *Subject Headings:* **1. Thermodynamics of the atmosphere 2. T bulence over the sea.**—*I.L.D.*

11.1–200 551.511.6:551.

†Hasselmann, Karl, **Zur Deutung der dreifachen Geschwindigkeitskorrelationen isotropen Turbulenz.** [Interpretation of the triple velocity correlations of isotropic t bulence.] *Deutsche Hydrographische Zeitschrift*, Hamburg, 11(5):207–217, **1958.** 6 fig 14 refs., 30 eqs. German, English and French summaries p. 207. **DWB**—The influence of t inertia forces in isotropic turbulence represented by the triple-velocity correlations in KÁRMÁ HOWARTH'S equation is explained in terms of the momentum convected through the surface a spherically delimited region in the fluid. Using this simple interpretation, an approxima expression for the triple velocity correlations is derived. The results confirm HEISENBERG basic concept of an additional turbulent viscosity acting on the larger eddies as a result of t momentum-transfer action of the smaller eddies, but show considerably closer agreeme with experiment than HEISENBERG'S expression. *Subject Headings:* **1. Isotropic turbulen 2. Triple velocity correlations 3. Momentum transfer.**—*Author's abstract.*

11.1–201 551.511.6:551.510.42:533.15:628.

Hilst, Glenn R. (*General Electric Co., Richland, Wash.*), **The dispersion of stack gases stable atmospheres.** *Air Pollution Control Association, Journal*, 7(3):205–210, Nov., 195 6 figs. (incl. photos), 3 tables, 7 refs., 12 eqs. **DWB, DLC**—Observations carried out on t diffusion and transport of stack effluents in stable atmosphere have led to the conclusion th the vertical distribution of concentration is a function of the Richardson number; that t diffusion parameters cannot be assigned to stable atmosphere *per se*; that when the conce tration of stack effluents is measured over a grid fixed with respect to the ground, it decreas significantly by large-scale meander. SUTTON'S model for the dispersion of stack gases a its shortcomings are analyzed. *Subject Heading:* **1. Stack effluent diffusion.**—*N.N.*

GENERAL CIRCULATION

See also: **Atmos. and sea in motion** (Bolin, *ed.*), 11.1–1; **General circulation** (Defant), 11.1–184; **Atmos. circulation changes** (Craig, Hering), 11.1–188; **General circulation** (Bundgaard), 11.1–196; **Jet stream analysis** (Mohri), 11.1–207; **Jet stream turbulence** (Fetner), 11.1–240; **Jet stream** (Georgii), 11.1–241.

11.1–202 551.513:551.583.

§Hess, Paul, **Weihnachts-Tauwetter durch Westwetterlagen.** [Christmas thaw due westerly weather situations.] *Orion*, Munich, 11(23/24):1001–1006, Dec. **1956.** 7 figs. **DI** (Q3.075)—Pressure and frontal distributions on Feb. 29, 1956 over the North Atlantic duri a series of cyclones (from Newfoundland to Norway) producing a typical westerly situatic are shown by a surface and a 200 mb (11–12 km) chart. Evaluation of this "type" is sho by a number of schematic cross section charts and diagrams, and the daily frequency of weste situations (1881–1950) throughout the year shown on a curve. It is seen these situations a most frequent in July and August and least frequent in April and May. The irregularit in the annual curve are considered as singularities, a special one from Christmas to New Y is identified as the Christmas Thaw—due to an increased cyclonic or westerly activity in t last week of December. *Subject Headings:* **1. Westerly weather situations 2. Christmas th 3. Singularities.**—*M.R.*

11.1–203 551.513.1:550.385

Macdonald, Norman J. and Roberts, Walter Orr, **Relationship of 300 mb circulation change to geomagnetic disturbances from 1952 to 1958.** *Colorado. Univ. High Altitude Observatory. Institute for Solar-Terrestrial Research, Technical Report,* No. 6, Nov. **1958.** 5 p. 2 tables, 6 refs. **DWB** (M13.1 C719t)—Statistical evidence has been presented strongly suggesting that troughs appearing at the 300 mb level over the Alaska-Aleutian area 3±1 days after magnetic disturbances are more likely to become larger troughs (more cyclonic curvature) than troughs appearing in that area at any other time. The sample of data is not large, but the level of significance is reasonably convincing. Some speculation has been made about physical mechanisms that might explain the statistics. No real confidence can be attached to the observed relations until the analyses have been extended further in time, and over a much larger area of the earth. To do this, we plan to use similar procedures at the 500 mb level which will allow us to extend the study in time back to 1946 and in space to all troughs (and ridges) over the Northern Hemisphere. *Subject Headings:* **1. 300 mb circulation-geomagnetic relationships 2. Trough structure 3. Alaska-Aleutian area.**—*Authors' abstract.*

11.1–204 551.513.1

§†Yeh, Tu-cheng; Dao, Shih-yen et al. (*all, Inst. Geophysics & Meteor., Academia Sinica*), **The abrupt change of circulation over Northern Hemisphere during June and October.** (In: Bolin, Bert (*ed.*), **The atmosphere and the sea in motion.** N. Y., Rockefeller Institute Press, **1959.** p. 249–267. 18 figs., 21 refs. **DLC.** (Also issued in: *Acta Meteorologica Sinica,* Peking, 29(4):249–263, Nov. **1958.** 18 figs., 19 refs. In Chinese, English summary p. 263.) **DLC**—In this paper we have shown that there is an abrupt change of upper-air circulation over Northern Hemisphere in June and October. In June the abrupt change is characterized by a sudden northward shift of westerlies and easterlies. With this there is a big change in upper flow pattern. After this variation the typical summer circulation is established. In October the abrupt change is characterized by a sudden southward shift of westerlies and easterlies. This is also accompanied by a marked variation in upper flow pattern. After this variation the typical upper winter circulation is established. With the onset of summer circulation comes the outburst of S.W. monsoon in India and of Mai-yu in China and Japan and a rapid northward rush of the intertropical convergence zone (ICZ). With the onset of winter circulation comes the retreat of SW monsoon and ICZ. The synoptic sequence of these developments are described. *Subject Headings:* **1. Atmospheric circulation changes 2. Upper air circulation 3. Waves in the westerlies 4. Intertropical Convergence Zone 5. Northern Hemisphere. I. Li, Mei-tsium.**—*Author's abstract.*

11.1–205 551.513.1

Yeh, Tu-cheng (*Inst. of Geophysics & Met., Acad. Sinica*), **On the mechanism of maintenance of zonal circulation.** *Geophysica,* Helsinki, 6(3/4):607–620, **1958.** 3 figs., 12 refs., 15 eqs. **DWB, DLC**—In this paper the role of mean meridional circulation in maintaining the zonal circulation is stressed. Integrating the equation for the balance of angular momentum of the atmosphere to the north of the boundary surface between the easterlies and westerlies, we obtain an equation in which the usual transfer term is absent. In this equation we see that the loss of relative angular momentum (called u-momentum) in the westerlies is balanced by the transfer of the angular momentum due to the earth's rotation (called Ω-momentum) by the Hadley cell. One branch of the Hadley cell enters into the easterlies at comparatively higher latitudes while the other branch enters into the upper westerlies at comparatively lower latitudes. In this way, the Ω-momentum is brought from the easterlies into the westerlies. Integrating again the equation of balance of angular momentum to the whole atmosphere above a certain level, we shall find that the turbulent downward transfer of u-momentum through this level should be balanced by the upward transfer of Ω-momentum through the same level by the mean meridional circulation. In connection with this, the mechanism of the seasonal variation of interchange of angular momentum between the earth and the atmosphere is also discussed. Besides the above-mentioned processes in the balance of angular momentum, the physical mechanism producing the positive correlation between u and v is also discussed. *Subject Headings:* **1. Zonal circulation 2. Angular momentum balance.**—*Author's abstract.*

11.1–206 551.513.2:551.55

*†Flohn, H.; Holzapel, R. et al., **Untersuchungen über die stratosphärische Ostströmun auf der Sommerhalbkugel.** [Investigations of the stratospheric easterlies in the summ hemisphere.] *Beiträge zur Physik der Atmosphäre*, Frankfurt a.Main, 31(3/4):217–243, 195 8 figs., 10 tables, 50 refs. German, English and French summaries p. 217. **DWB, DLC** On the basis of actual wind observations, the stratospheric easterlies above the summe hemisphere are reviewed. Their lower boundary is situated in middle latitudes at 18 to 2 kms, decreasing towards the equator and the pole. The upper boundary is to be found ne 80 kms. In middle latitudes, the easterlies last from May to August, but varying from year t year; in the subtropics they extend to the transitional seasons. Their velocity increases wit height up to 32 kms, at least. South of the large continents of the Northern Hemisphere, w observe a tropical easterly jet with velocities of 20 to 50 m sec^{-1} and with a constancy of 95 t 100%. Above Europe and Eastern Asia, practically no relation exists between the easterlie above 20 to 22 kms and the varying winds near the tropopause, and the constancy of th easterlies reaches 80 to 90% too. Based on constant level balloon tracks, the occurrence "mesometeorological" oscillations is demonstrated. *Subject Headings:* **1. Stratospheri easterlies 2. Europe 3. Eastern Asia. I. Oeckel, H.**—*Authors' abstract.*

11.1–207 551.513.2:551.557.5:551.515.82

†Mohri, K. (*Japan Met. Agency, Tokyo*), **Jet streams and upper fronts in the genera circulation and their characteristics over the Far East, Pt. 1.** *Geophysical Magazine*, Tokyo 29(1):45–126, Nov. **1958.** 3+figs., 3+tables, bibliog. p. 124–126, 3+eqs. **DWB, DLC**— The jet stream and the upper front are studied from dynamic and synoptic standpoints base on the analysis of the scale of the Northern Hemisphere. A general idea for the formation an maintenance of the jet stream and the upper front is presented, and is applied for the descriptio and explanation of characteristic features of jet streams and upper fronts over the Far East Especially, the subtropical jet stream and the associated subtropical front over Japan and it vicinity are analyzed in detail. The importance of these phenomena in the general circulatio is pointed out. *Subject Headings:* **1. Jet stream analysis 2. Upper air fronts 3. Far East.**— *Author's abstract.*

11.1–208 551.513.2:551.557.

†Pogosian, Kh. P., **Sezonnye osobennosti raspredeleniia struĭnykh techniĭ v severnom polusharii.** [Seasonal characteristics of the distribution of jet streams in the Northern Hemisphere.] *Meteorologiia i Gidrologiia*, Leningrad, 9:3–14, **1957.** 2 figs., 2 tables, 25 refs **DWB, DLC**—On the basis of individual studies and a review of the literature, the autho discusses the seasonal characteristics of the jet streams in the Northern Hemisphere, including their velocities at 300 mb, and their geographical distribution as indicated by frequency o occurrence at different latitudes. Charts showing the frequencies of jet streams at 300 mb and mean wind values at 300 and 200 mb in January and July, 1956 and tables giving the distribution in percent of different wind velocities in the Northern Hemisphere during January and July from lat. 15° to 85°N are presented. *Subject Headings:* **1. Seasonal jet stream variations 2. Jet stream distribution 3. Northern Hemisphere.**—*I.L.D.*

11.1–209 551.513.2:551.557.5

†Radok, Uwe and Clarke, R. H., **Some features of the subtropical jet stream.** *Beiträge zur Physik der Atmosphäre*, Frankfurt a.Main, 31(1/2):89–108, **1958.** 9 figs., table, 22 refs. 15 eqs. German, English and French summaries p. 89. **DWB, DLC**—The upper zonal flow in subtropical latitudes is examined by means of two sets of instantaneous meridional cross-sections through eastern Australia, each covering a three-day period. Upper winds were derived from thermal cross sections by means of the geostrophic approximation. Strong winds of the upper troposphere were built up by small increments derived from the meridiona slope of the isentropes by using the geophysical procedure of MATTHEWMAN (*Met. Magazine* 79:97–102, **1950**; *see* 1.7–10, 1950) adapted by U. RADOK and A. M. GRANT (*Weather Development Research Bulletin*, No. 17:39–49, **1951**; *see* 3.6–86, June 1952, *MAB*). Shear values were computed from velocity cross sections representing purely zonal flow and equations describing the criteria of dynamic instability dependent upon isentropic shear; this criteria being

$\partial u_g/\partial y)_\theta \geq F + 3u_g \tan \varphi/a$ (where u_g = geostrophic zonal wind; F = Coriolis parameter, a = radius the earth, θ = indicates that meridional differentiation in latitude φ is to be performed along isentropic surface) and the Richardson criterion. This is followed by a discussion of the matology of the subtropical jet stream over southeast Australia, including frequencies of erage strength of velocity maxima in 147.5°E (1954), detailed descriptions of two sets of eridional cross sections, each covering three consecutive days in mid-winter (July 1949 and 52) and a survey of the antecedents and consequences of jet flow in the eastern Australian gion for the two occasions and for the entire year (1954). "The subtropical jet stream ructure appears to differ from that of the polar front jet stream mainly in the location of the incipal baroclinic region, which is found in the upper troposphere and resembles a continuaon of the polar tropopause into low latitudes." The two types of jet stream resemble one nother by their maximum shear values and by narrow zones of very high absolute vorticity ear the jet axis. The distribution of high and middle clouds is not dependent on the location the subtropical jet axis or the regions of dynamic instability, but may be linked to low lues of the large-scale Richardson number. There are indications that marked development the subtropical jet stream is followed by cyclogenesis in low latitudes. The derivation of $i = F/\Delta S$ is presented in appendix. *Subject Headings:* **1. Subtropical jet stream 2. Meriional cross sections 3. Eastern Australia.**—*Authors' summary and I.L.D.*

ATMOSPHERIC DISTURBANCES

See also: **Synoptic charts of hurricane** (U.S.W.B.), 11.1–37; **Tropical cyclones, W. Pacific and China Sea, 1884–1955** (Chin), 11.1–38; **Polar front theory** (Rigby), 11.1–76; **Swell-cyclone relationships, Guadalupe Is.** (Munk, Snodgrass), 11.1–98; **Radar obs. of thunderstorms** (Imai), 11.1–139; **Thunderstorms, Japan,** 11.1–148; **Cyclogenesis forecasting** (George), 11.1–172; **Hurricane surge forecasting** (Hoover), 11.1–173; **Frontal effects on refractive index** (Bean, Riggs), 11.1–189; **Eye formation in convective vortices** (Kuo), 11.1–197; **Upper air fronts** (Mohri), 11.1–207.

11.1–210 551.515:551.481.2

Donn, William L. (*Lamont Geological Obs., Columbia Univ.*), **The Great Lakes storm urge of May 5, 1952.** *Journal of Geophysical Research,* Wash., D. C., 64(2):191–198, Feb. 959. 5 figs., 2 tables, 7 refs. **DLC**—A damaging storm surge struck much of the shore zones f Lakes Huron and Erie on the morning of May 5, 1952. The surge, which was associated ith a moving atmospheric pressure-jump of average characteristics, is explained on the basis f resonant coupling to both edge waves and gravity waves. The latter in turn created aboveormal seiches in lake areas with appropriate dimensions and forms. A pronounced lag ccurred between the surge and the generating air disturbance at places where lake parameters id not permit resonant coupling, with the surge arriving from regions where coupling was ossible. *Subject Headings:* **1. Pressure jump lines 2. Storm surges 3. Great Lakes.**—*Author's abstract.*

11.1–211 551.515:551.556.8:551.461.2(261.2)

†Rossiter, J. R., **Storm surges in the North Sea, Dec. 11–30, 1954.** *Royal Society of ondon, Philosophical Transactions, Ser. A.,* 251(991):139–160, Dec. 4, **1958.** 10 figs., 7 ables, 20 refs., eqs. **DWB, DLC**—The disturbances produced by the stormy conditions of December 1954 have been analyzed. The basic data used were tidal observations at 10 British and 15 continental stations in the North Sea and English Channel, together with records f the mean flow of water through the Straits of Dover as represented by electromagnetically nduced currents in a telephone cable running from St. Margaret's Bay to Sangatte. The ain purpose of the investigation has been to determine the relative magnitudes of the various actors contributing to the phenomena. The effect of westerly winds has been shown to epend upon whether the wind system is confined to the North Sea, or to the northwestern pproaches to the sea, or is a broad airstream covering both areas. Evidence has been put orward for the existence of a 'return' surge, or southward return of water previously expelled rom the North Sea, on 15 Dec. Codisturbance charts have been constructed for the large urges of 20 to 25 Dec., and the water movements thus deduced exhibit marked geostrophic ffects in all cases. An example of an external surge has been noted. Representing the sea

by a rectangle, a correlation of 0.96 was found between the longitudinal water gradient and t geostrophic wind; this analysis led to a value of the wind stress coefficient, y^2, of $2.7\times10^{-}$ The transverse gradient has been shown to be composed of a direct wind effect and a larg geostrophic effect. Estimates have been made of the mean level of the sea which, duri surge peaks, was some 2.5 ft above normal, and these have been represented satisfactorily l winds in and to the north of the sea. The cable measurements throughout the whole perio have been analyzed at intervals of 25 h, and, after BOWDEN (**1956**), provided estimates $y^2(2.1\times10^{-3})$ and the bottom friction coefficients $k(3.5\times10^{-3})$. A similar analysis of t data at 3 h intervals gave values of 2.3×10^{-3} and 4.5×10^{-3}, respectively. The subject of t oscillatory development of storm surges has been reviewed with particular reference to t North Sea, and the conclusion reached that for this area the motion appears to be so heavi damped that positive surges may be represented, for practical purposes, by equilibrium conc tions modified by a time lag. Negative surges, however, exhibit a strong tendency towar oscillations, as evidenced by the existence of return surges. *Subject Headings:* **1. Storm surg 2. North Sea.**—*Author's abstract.*

11.1–212 551.515.1:551.509.311(699.13)(26

*Gilbert, J.; Lambert et al., **Quelques caractéristiques des perturbations observées Kerguélen en 1951.** [Some characteristics of disturbances observed at Kerguelen in 1951. *La Météorologie*, 4th Ser., No. 32:245–252, Oct./Dec. **1953.** 3 figs., 5 tables. French, Englis and Spanish summaries p. 245. **DWB**—A statistical study of synoptic cases of disturbance occurring between Marion Island and Kerguelen or Heard Islands. Frequency and duratio (and number in a "family") of fronts, depressions and storms are tabulated and discussed wit respect to air mass type (cold or warm) and direction of flow. Simple forecast rules are als set forth in the text and particular situations are discussed by way of examples, especially of th formation of waves west of Kerguelen Island. *Subject Headings:* **1. Synoptic studies 2. Cy clonic storms 3. Indian Ocean 4. Kerguelen Island. I. Goyer, G.**—*M.R.*

11.1–213 551.515.11(267

Rai Sircar, N. C. (*Met. Off., Poona*), **A note on the vertical structure of a few disturbance of the Bay of Bengal.** *Indian Journal of Meteorology and Geophysics*, Delhi, 7(1):37–42, Jan **1956.** 11 figs., 2 refs. **DWB, DLC**—Three cases of Bay of Bengal cyclones are analyzed wit respect to their vertical structure and the relation of the vertical structure to genesis an intensification. Radiosonde data for Calcutta and 4 other stations are used. The storm o Aug. 1–4, 1953, was attended by a westward moving high level depression at the head of th Bay of Bengal, but when the cyclone was strong at low levels, pressure was high at high levels Diagrams show cross sectional geopotential height, solenoidal fields and storm tracks. Th weaker storms of Oct. 1–5, 1948 and June 24–27, 1948 are treated similarly. The eye of th Aug. 1953 storm and the temp. distribution inside and outside the eye are discussed an illustrated. *Subject Headings:* **1. Vertical structure of tropical cyclones 2. Tropical cyclon structure 3. Eye of Bay of Bengal storms 4. Cyclones, Bay of Bengal 5. Bay of Bengal** —*M.R.*

11.1–214 551.515.21:551.55

Miller, Banner I. (*U. S. W. B. Miami, Fla.*), **Use of mean layer winds as a hurricane steering mechanism.** *U. S. Weather Bureau, National Hurricane Research Project Report* No. 18, June **1958.** 24 p. 19 figs., 2 tables, 6 refs. **DWB** (M15.2 U5845r)—The mean win around a tropical cyclone is determined for several layers of various thicknesses extending from the surface to 16 km. This is done by combining wind observations from a large numbe of storms in order to obtain a composite picture of the hurricane circulation. The resultan wind for each layer is calculated over a ring extending 2°–6° of latitude from the center of the hurricane. This resultant is compared with the mean motion of the storm in an effort t establish the layer whose mean flow corresponds most closely to the motion of the hurricane The data indicate that for moderate to intense storms the best steering layer is the 500 t 200 mb layer. Finally an effort is made to develop a constant pressure chart which wil represent the mean flow for a deep layer. This is done by averaging the standard constan pressure heights for the bottom, the middle, and the top of the layer. The geostrophic com ponents are calculated from the mean chart and these components are compared with th

tual mean wind for the layer. It is concluded that the standard constant pressure chart at e middle of the layer affords as good an approximation of the mean wind for the layer as es the mean chart. *Subject Headings:* **1. Mean wind flow pattern 2. Hurricane steering.**—*uthor's abstract.*

11.1–215 551.515.21

†Takeuchi, M. (*Met. Res. Inst., Tokyo*), **A note on the theory of the formation of tropical clones.** *Papers in Meteorology and Geophysics*, Tokyo, 5(2):124–133, Sept. **1954.** 3 figs., refs., numerous eqs. **DWB.** Abstract only issued in UNESCO Symposium on Typhoons, ov. 9–12, 1954, **Proceedings.** pub. Tokyo, **1955.** p. 163. **DWB**—The following stability iterion of a motion of a circular vortex embedded in a geostrophic general current is evaluated means of the parcel method, i.e.:

$$\frac{\partial v\Theta g}{\partial r} < -\lambda\left(1+\frac{g}{8R_N}\right)$$

here R_N is the Richardson number, λ the Coriolis parameter and $v\Theta g$ the tangential component a geostrophic general current. This stability criterion is evaluated for the case in which e cyclonic circulation of circular vortex develops. This shows that the conditions for the rmation of tropical cyclones can be described as the combined effect of the vertical shear and e static and dynamic stability. It is emphasized that the barotropic state of the upper mosphere is very favorable for the formation of tropical cyclones in the atmosphere of static stability. An example on August 1950 is also discussed. *Subject Headings:* **1. Tropical clone theory 2. Tropical cyclone formation.**—*Author's abstract.*

11.1–216 551.515.3(728)

Beebe, Robert G. (*U. S. Weather Bureau*), **Notes on Scottsbluff, Nebraska, tornadoes, ne 27, 1955.** *American Meteorological Society, Bulletin*, 40(3):109–116, March **1959.** fig., photos, 2 refs. **DWB, DLC**—Some general characteristics of thirteen tornadoes that ocrred on the afternoon of 27 June 1955 in Scottsbluff County, Nebr., are related. Two of ese caused widespread attention due to their size and their proximity to the cities of Scottsuff and Mitchell, Nebr. These two were photographed extensively by residents near their ths. The experience of two men directly beneath one of the two large tornadoes is related. *ubject Headings:* **1. Tornadoes, Nebraska (June 1955) 2. Scottsbluff County, Nebr.** – *uthor's abstract.*

11.1–217 551.515.4

Mason, B., **The theory of the "thunderstorm model."** (In: Australia. Bureau of eteorology, **Conference on estimation of extreme precipitation, Melbourne, April 1958.** elbourne, Dec. **1958.** p. 103–126. fig., table, 16 refs., 2 eqs.) **DWB** (M77.31 C748c)—y a consideration of the basic equation of continuity of water vapor in an air mass, the factors kely to affect total precipitation are discussed. How these factors can be varied to make the tal precipitation a maximum is considered, the discussion being restricted to the special case the thunderstorm cell. The thunderstorm model as used by the Hydrometeorological ction of the U. S. Weather Bureau is described and discussed. *Subject Headings:* **1. Thunderorm models 2. Thunderstorm theories.**—*Author's abstract.*

RADIATION AND TEMPERATURE

RADIATION

See also: **IGY airglow program,** 11.1–39; **IGY solar radiation program** (Bruzek), 11.1–40; **Infrared radiation meas., McMurdo Sound** (Gergen), 11.1–54; **Forest radiation interception** (Baumgartner), 11.1–122; **Solar installations** (Markov), 11.1–129; **Illumination effects on cockchafer migration** (Chopard), 11.1–297; **Airglow polarization** (Hoffmeister), 11.1–307.

11.1–218 551.521.14:551.578.46:551.508.29

de Percin, Fernand, **Some observations of the effect of direct and snow-reflected solar diation on exposed and shielded thermocouples.** *U. S. Quartermaster Research & Engineer-*

ing Center. Environmental Protection Research Division, Research Study Report, RER-1 April **1958.** 5 p. 2 figs., table, 2 refs. **DWB** (M86 U5.85re)—Methods and results of f simultaneous study of this effect carried out at Fort Greely, Big Delta, Alaska on 17 Ap 1957, using three sets of exposed, white painted, and shielded 20-, 30-, and 36-gauge therm couples, connected to a 12-point Minneapolis Honeywell-Brown recording potentiometer, a described and discussed. On the basis of results (presented in a table), the use of 20-gau shielded thermocouple, which proved to be more accurate, sensitive and capable of wit standing effects of weathering by wind, ice, snow, etc., is recommended for making measur ments in cold regions. *Subject Headings:* **1. Radiation effects on thermocouples 2. Albe of snow 3. Shielded thermocouples 4. Fort Greely, Alaska.**—*A.M.P.*

11.1–219 535.34 551.521.3:551.5

Haubert, A., **Note sur l'interprétation des mesures d'absorption effectuées à Slough 1946 et 1947.** [Note on the interpretation of absorption measurements made at Slough 1946 and 1947.] *Rabat, Morocco. Institut Scientifique Chérifien. Service de Physique Globe et de Météorologie, Annales,* 16:153–164, **1956.** 4 fig., 3 refs. **DLC**—An attempt is ma to interpret absorption measurements made at Slough in 1946 and 1947 by means of expressio taking into account the number of electronic shocks in the absorbing region. The valu which may then be computed according to the measurements, agree with the presumed altitu of the absorbing region. If the proposed interpretation is adopted it will no longer be necessar as a first approximation, to consider gyrofrequency in the formulas as long as one does n approach too close to its value. One notes then that the absorption anomaly in winter, di appears from the parameters, which conform to almost regular seasonal laws. The law absorption variation with respect to zenith height is complex, for all the parameters do n conform in the same manner to the yearly variation and to the diurnal variation of cos *Subject Headings:* **1. Absorption measurement 2. Seasonal change influence on absorptio 3. Zenith height influence on absorption 4. Slough, Eng.**—*A.V.*

11.1–220 523.77:551.521

Mein, P. (*Inst. d'Astrophysique, Paris*), **Spectre continu du soleil.** [The sun's continuo spectrum.] *L'Astronomie,* Paris, 73(1):5–11, Jan. **1959.** 6 figs. **DLC**—Definition an measurement of the sun's continuous spectrum. Subjects considered are: The processes use in order to eliminate the action of the terrestrial atmosphere (telluric lines and atmospher absorption); comparison of the sun's continuous spectrum with the spectrum of black bo radiation; description of the solar phenomena which cause the continuous spectrum; absorptio through neutral hydrogen; absorption due to the negative H^-; absorption through atoms an metallic ions; Rayleigh diffusion, etc. The variations of the absorption modulus in the a mosphere in terms of the wave length are given. *Subject Headings:* **1. Sun's continuo spectrum 2. Atmospheric absorption 3. Telluric lines.**—*A.V.* Ⓢ.

TEMPERATURE

See also: **Degree-day data,** 11.1–25; **Frost protection for orchards** (Aerts et al.), 11.1–120; **Temp. data, Gottwaldov-Zlín** (Quitt), 11.1–150; **Tropopause temps.** (Kaminer), 11.1–187; **Inversions** (Kuettner), 11.1–230; **Wind velocity-temp. profiles** (Tani et al.), 11.1–237; **Temp.-river discharge relationships** (Shcheglova), 11.1–272; **Temp. effects on cockchafer migration** (Chopard), 11.1–297.

11.1–221 551.524.1:535.4:551.510.6

Gerhardt, J. R., **Refractive index and air temperature fluctuations—University of Texa** (In: Lettau, H. H. and Davidson, Ben. (*eds.*), **Exploring the atmosphere's first mile.** N. Y Pergamon Press, **1957.** Vol. 1:220–227. 5 figs., table, 7 refs., 2 eqs.) **DWB**—The autho describes the microwave refractometer which measured the difference in the resonant fre quencies of two nearly identical cylindrical cavities operating in the 3.2 cm wave length regio of the electromagnetic spectrum and the theory of the measurement of the absolute value the index of refraction in microwave frequencies is reviewed. Graphical and numerical dat on the normalized power spectra for simultaneous refractive index and temperature fluctuation root-mean-square values and cross-correlation coefficient for selected nets of refractive inde

id air temperature variations are presented and analyzed. *Subject Headings:* **1. Refractive dex variations 2. Microwave refractometers 3. Temperature effects on refractive index.** *–I.L.D.*

11.1–222 551.524.3:551.543:551.583.13(410)

Glasspoole, J., **Recent seasonal climatic trends of pressure and temperature variability ver Great Britain.** *Meteorological Magazine*, London, 88(1043):137–142, May **1959.** 4 figs., refs. **DWB, DLC**—An earlier note on new climatological averages for Great Britain and orthern Ireland (*see* 5.7–177, July 1954, *MAB*), explained how general monthly values of emperature, sunshine and rainfall were obtained. These were used to give a comparison of the ew averages with those previously used in official publications. In the case of pressure the omparison was made direct from maps for the old and new periods without reference to the erial monthly values. A further note (*see* 6.6–305, June 1955, *MAB*) dealt with the seasonal limatic trends based on the serial values of temperature, sunshine and rainfall, and a third ote (*see* 10.5–297, May 1959, *MAB*) with the seasonal trends in the number of rain-days. his fourth note considers the trends of pressure in a similar manner and the trend in the 20- ear standard deviation of temperature. *Subject Headings:* **1. Seasonal variations 2. Temerature variations 3. Pressure variations 4. Great Britain.**—*Author's abstract.*

11.1–223 551.524.3/.4(572)

Nikol'skiĭ, K. N., **Osobennosti zimnego temperaturnogo rezhima Tuvinskoĭ avtonomnoĭ oblasti.** [Special features of the winter temperature regime of Tuva Autonomous Region.] *Meteorologiia i Gidrologiia*, Leningrad, No. 12:22–27, **1957.** 3 figs., 3 tables, 2 refs. **DWB, DLC**—The physical geography of the Tuva Autonomous Region (50–54°N lat.; 89–99°E long.), which is surrounded entirely by mountains, is described briefly. As a consequence of the Siberian anticyclone, cold air accumulates and stagnates in the Tuva depression as early as fall. Minimum temperatures may reach −50°C at Kyzyl and the January mean is between −30 nd −32°C. Both cold and warm fronts glide in above the stable and cooled air layer so hat they are upper air fronts. Their passage in winter does not produce marked change in veather. Wind velocities never exceed 10 m/sec at Kyzyl; calms and velocities of 1 m/sec predominate. In winter cloudiness is not observed below 600 m. A deep temperature nversion is established at the end of November and continues to February; it is finally completely destroyed in April. The variations in the height of the inversion with inversion of old fronts and cold waves of Arctic or continental air and associated wind velocities, the pecial characteristics of the temperature distribution in the Tuva inversion as compared vith that of Krasnoyarsk, etc. are discussed. Data on the incidence (in percent) of different wind velocities at various hours of observation at Kyzyl, maximum wind velocities (m/sec), distribution of temperature with height and the characteristic inversion at Kyzyl, also charts showing temperature stratification, are presented. *Subject Headings:* **1. Temperature regime 2. Record low temperatures 3. Temperature inversions 4. Tuva Autonomous Region, U.S.S.R.**—*I.L.D.*

11.1–224 551.524.36

Salzmann, Karl H., **Der Kältepol is nicht Werchojansk.** [The cold pole is not Verchoyansk.] *Orion*, Munich, 11(19/20):786–787, Oct. **1956.** 2 figs. **DLC** (Q3.075)—A brief article giving the history and known facts about record low temperatures at Verkhoyansk and Oimekon on the Indigirka (63°15′N, 143°12′E) 650 km SW. It is stated that Oimekon had a temperature of −78°C and a January mean of −51°C. At Eismitte (71°19′N, 39°56′W) at 3000 m on Greenland, Alfred Wegener found temperatures of −50° to −65°C in 1930/31. Maps showing Jan. and July isotherms for Siberia, indicate relative positions of the two stations. *Subject Headings:* **1. Cold poles 2. Oimekon, Siberia.**—*M.R.*

SOIL TEMPERATURE

See also: **Snow, ice and permafrost bibliogs.,** 11.1–81.

11.1–225 551.525:625.8

Barber, Edward S. (*Bur. of Pub. Roads, Physical Res. Branch*), **Calculation of maximum pavement temperatures from weather reports.** *National Research Council. Highway Re-*

search Board, Bulletin, No. 168:1 8, **1957.** 7 figs., 4 tables, 9 refs. **DWB**—Pavement temperatures are of interest in connection with stabilization of bituminous surfaces, curing and curling of portland cement concrete, and moisture movements in any type of pavement. This paper presents a relation between pavement temperature and wind, precipitation, air temperature, and solar radiation, as controlled by the thermal properties of the pavements. *Subject Heading:* **1. Pavement temperatures.**—*Author's abstract.*

11.1–226 551.525.4(71)

†Crawford, C. B. and Legget, R. F., **Ground temperature investigations in Canada.** *Engineering Journal*, Montreal, 40(3), March **1957.** 9 figs., 16 refs. **DLC.** Reprint of 7 p. issued by National Research Council of Canada.—Curves of monthly mean ground temperature to 16–20 ft depth in various soils at Ottawa and at Knob Lake under natural cover and under snow-cleared road, or surface are presented and discussed. Methods and instruments used are described and illustrated. Work which has been carried on at Aishihik, Yukon Territory; Aklavik, Yellowknife, Fort Smith, Resolute Bay (all Northwest Territory); Uranium City and Saskatoon, Saskatchewan; Winnipeg, Manitoba; London, Ontario; and at Knob Lake, Labrador, is described and illustrated. A lag of about 6 months is found in ground temperature at the critical depth of 16–20 ft. *Subject Headings:* **1. Soil temperatures 2. Canadian Arctic 3. Canada.**—*M.R.*

11.1–227 551.525:631.43:536.24

Suomi, V. E. (*Univ. of Wisconsin*), **Heat storage variations—University of Wisconsin.** (In: Lettau, H. H. and Davidson, Ben. (*eds.*), **Exploring the atmosphere's first mile.** N. Y., Pergamon Press, **1957.** Vol. 1:79–80. fig., ref., 2 eqs.) **DWB**—The Univ. of Wisconsin values (Vol. 2) of heat flow by conduction into or out of the soil per unit time were obtained by calorimetry *in situ*. "For a soil layer of finite thickness the gain or loss of heat per unit area is given by the product of mean heat capacity per unit volume, mean temperature change per time and thickness of the layer in question. The values of mean temperature change were obtained from the soil temperature integrators." The values show a sharp increase in temperature of the 0–5 cm soil layer about 2 hrs after sunrise and 2 hrs before sunset in the early August runs. These apparently unreasonable sharp temperature changes cannot be explained in terms of experimental error. An analysis of the heat flux values at 5 and 15 cm indicates that a large fraction of the soil heat budget is contained in the first 5 cm of the soil. *Subject Headings:* **1. Soil heat conductivity 2. Soil heat flux 3. Soil temperature variations.** —*I.L.D.*

11.1–228 631.43:536.24:551.525

*Suomi, V. E., **Soil density and heat capacity—University of Wisconsin.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y., Pergamon Press, **1957.** Vol. 1:39–40, 2 tables. **DWB**—Density and heat capacity determinations were made on cylindrical soil sections 5 cm in diameter. Soil heat capacity was measured in a motor stirred Cenco vacuum jacketed electric calorimeter. The soil density was determined from the wet and dry weight of a three sample mixture. Tables giving soil heat capacity (cal cm^{-3} deg^{-1}) from the electric calorimeter and soil heat capacity and density from gravimetric determinations at O'Neill, Nebr. are presented. *Subject Headings:* **1. Soil density 2. Soil heat capacity 3. Calorimeters.**—*I.L.D.*

PRESSURE AND WIND

PRESSURE

See also: **Air pressure data, Netherlands lightships** (Verploegh), 11.1–31; **Pressure gradient at edge of ice sheet,** Greenland (Hamilton), 11.1–49; **Diurnal pressure variations, Greenland** (Hamilton), 11.1–50; **Temp.-pressure relationships** (Kaminer), 11.1–187; **Seasonal pressure changes** (Glasspoole), 11.1–222.

11.1–229 551.543:551.586:612:014.4

Dordick, Isadore, **The influence of variations in atmospheric pressure upon human beings.** *Weather*, London, 13(11):359–364, Nov. **1958.** table, 9 refs. **DWB**—A critical examination

f the present state of knowledge of, and evidence on, the influence of gradual and sudden eriodic changes in atmospheric pressure, associated with frontal passages and föhn for example, pon the physiological responses of human beings. The author summarizes the biological ffects of fluctuations of atmospheric pressure upon human beings under natural and experimental conditions. Analysis of the evidence indicates the following: there is no clear evidence hat variations of atmospheric pressure such as those associated with atmospheric "lows" or highs" have any unique effect upon the human organism. The small scale pressure oscillation onsisting of relatively small amplitude and short period cannot be considered as exerting any nequivocal biological influence upon human beings. Those pressure oscillations allegedly esponsible for "föhn disease" are not unique phenomena. There is some experimental vidence that rapid pressure fluctuations such as 3.2 to 4.8 mb/min produce discomfort in some ndividuals. At present it is not possible to predict any physiological and psychological eactions of human beings from changes in barometric pressure of the amplitude and period haracteristic of natural conditions. *Subject Headings:* **1. Pressure effects on man 2. Föhn ickness.**—*I.L.D.*

11.1–230 551.541:551.524.4:551.555.3

Kuettner, Joachim, **The rotor flow in the lee of mountains.** *U. S. Air Force. Cambridge Research Center, GRD Research Notes*, No. 6, Jan. **1959.** 20 p. 12 figs. (incl. photos), 16 refs., 15 eqs. (For author's abstract on this title from another source, *see* 9.11–86, Nov. 1958, *MAB.*) *Subject Headings:* **1. Orographic waves 2. Inversions 3. Föhn winds.**

11.1–231 551.541:551.558.21

Wallington, C. E. (*Met. Off., Air Min., Dunstable, Eng.*), **An introduction to lee waves in the atmosphere.** *Schweizer Aero-Revue*, Zurich, 34(3):187–190, March **1959.** 4 figs., table, 12 refs. **DLC**—A popular article on origin and character of lee waves designed for glider pilots. Lee wave length, lee wave amplitude, vertical currents and wave clouds are clearly explained by means of figures. Conditions commonly associated with waves and supplementary conditions are given and stress is laid on the intricacy of relationship between winds, temperatures, lee wave length and amplitude. Requirements needed for waves to form are explained and an example given of the investigations in the Sierra Nevada. Finally, the occasional phenomena of rotor flow, upwind jump and double wave systems are treated. *Subject Headings:* **1. Lee waves 2. Sierra Nevada, Calif.**—*A.V.*

11.1–232 551.543:551.511.3

Vandenplas, A., **Contribution à l'étude théorique de la variation locale de la pression atmosphérique.** [Contribution to the theoretical study of local variations of atmospheric pressure.] *Belgium. Institut Royal Météorologique, Publications, Ser. B*, No. 17, **1955.** 17 p. 2 refs., numerous eqs. **DLC, DWB**—A three-dimensional analysis of atmospheric processes based on the fundamental dynamic equations considered the horizontal divergence of isobars and geostrophic winds as well as the "thermal winds." The study leads to individual and local pressure variations and finally discusses the significance of barometric tendency. *Subject Headings:* **1. Dynamics of the atmosphere 2. Pressure variations.**—*A.A.*

11.1–233 551.547.5:551.510.3

Mook, Conrad P. (*Diamond Ordnance Fuze Lab., Dept. of Army, Wash., D. C.*), **Estimating the variance of density of constant height from constant pressure data.** *Monthly Weather Review*, Wash., D. C., 86(8):309–311, Aug. **1958.** fig., 3 tables, 7 refs., 8 eqs. **DWB, DLC**—A method is presented for utilizing atmospheric statistics developed for constant pressure surfaces in estimating the variance of density at constant height. The method depends upon recent advances in the study of the interrelation of atmospheric statistics. *Subject Headings:* **1. Constant pressure surfaces 2. Upper air density variance.**—*Author's abstract.*

11.1–234 551.547.5:551.557.2(213)

Vítek, Vojtečh (*Geophys. Inst., Czechosl. Acad. Sci., Dept. of Short-range Forecasting, Prague*), **On the question of the relation between the fields of pressure and motion in low latitudes.** *Studia Geophysica et Geodaetica*, Prague, 2(1):93–95, **1958.** 2 refs., 6 eqs. **DWB**—

"One of the basic equations of atmospheric dynamics is the equation of motion of horizontal flow without friction which in the p-system can be written in the form $\dot{v} = -\nabla_p \Phi - \lambda k \times v$ where v denotes the horizontal wind vector in the isobaric surface, Φ is the geopotential, λ the Coriolis parameter and k the unit vertical vector." The results and conclusions are rough approximations in view of the many unsolved problems of tropical meteorology. *Subject Headings:* **1. Pressure fields 2. Upper air wind distribution.**—*N.N.*

WIND

11.1–235 551.55:797.14

Francis, J. R. D. (*Imperial College, London*), **Yachtsmen's gales at Cowes.** *Weather*, London, 13(4):117–120, April **1958.** fig., 2 tables, ref. **DWB**—During the annual regatta week at Cowes in the Isle of Wight (the first week in August), the forecasts often warn of danger of gales which do not occur or only occur in peak gusts. Hence, it has become a legend that the week usually ends in a gale (the last 2 days) causing cancellation of the races. Comparison of data for 1919–1954 at Calshot, 3 mi north (and nearby stations during the war years when no observations were made there), shows that the week of the races is remarkably free from gales, in fact has lower average wind speeds than the week before, or after, though this difference is not statistically significant. The number of days with winds of force 6 or over (1919–1957) was 17 the week before, 8 during Cowes week and 16 the week after. *Subject Headings:* **1. Wind singularities 2. Yachting weather 3. Cowes, Isle of Wight 4. Calshot, Eng.**—*M.R.*

11.1–236 551.553.6(477)

*Rozova, E. S., **K voprosu o maksimal'nykh skorostiakh vetra na Ukraine.** [Maximum wind velocities in the Ukraine.] *Kiev, Ukraine. Ukrainskiĭ Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy*, No. 8:115–120, **1957.** 2 figs., 3 tables, ref. **DLC**—In view of the absence of anemographs on the Ukrainian network of hydrometeorological stations and the fact that wind velocities are measured with Wild wind vanes at determined hours only, no reliable information on maximum wind velocities is available at present. However, an idea of wind velocity can be obtained by the study of cases when especially strong winds have been observed. An example is the cyclone that passed over the Ukraine on Feb. 22, 1953, which is analyzed in detail here. The distribution of maximum wind velocities on that day is presented in tables and a map showing that winds reached a speed of up to 34–40 m/sec on the Kiev-Osipenko line in central Ukraine. Other cases of high wind velocities in various years and at various points are cited. High velocity winds are frequent on the Blach Mountain in the Carpathians, where an observatory has been built at 2023 m altitude. Wind velocity observations there show that winds exceeding 40 m/sec occur every month. *Subject Headings:* **1. Maximum wind velocities 2. Ukraine.**—*A.M.P.*

11.1–237 551.554:551.524.4

Tani, N.; Inoue, E. et al., (*National Inst. of Agric. Sciences*), **Some measurements of wind over the cultivated field, Pt. 6.** *Journal of Agricultural Meteorology*, Tokyo, 13(4):143–146, May **1958.** 3 figs., 3 refs., eqs. In Japanese; English summary p. 146. **DWB**—Since measurement of air temperature could not be obtained with the same accuracy as measurement of wind velocity, we have had difficulty obtaining the relationship between the mean wind velocity profile and the temperature profile. The cause of error in temperature measurement depends on both the type of apparatus and the method of observation, but only the latter is discussed here. The mean wind velocity is easily obtained from numbers of electric contacts of cup anemometer while the thermometer is read point to point. It is necessary for the measurement of mean air temperature that the number of readings must be as many as possible during the averaging time and, therefore, the thermometer must have a rapid response, a quick indication and a high sensitivity. Copper-constantan thermojunctions, a potentiometer and a galvanometer are usually adopted for temperature measurement in the micro-meteorological observations. In our experience, at least about 12 sec were needed for one point reading by these apparatus. Therefore, when measuring points are 12 and observing time is 5 min, the readings are only twice per one point, which are too few to obtain the mean temperature.

The use of an electronic D.C. voltmeter instead of a potentiometer and a galvanometer is very appropriate for rapid readings. When the range selector is set at ±250 micro volt in full scale, the minimum scale corresponds to about 0.125°C and one reading takes only 2–3 seconds. By this voltmeter we could obtain a smooth profile from 7 readings in 10 min. *Subject Headings:* **1. Mean wind velocity-temperature profiles 2. Temperature measurement techniques 3. Wind velocity profiles. I. Imai, K.**—*Authors' abstract.*

11.1–238 551.55:612.014.4(71)

*Thomas, M. K. and Boyd, D. W., **Wind chill in northern Canada.** Reprint from the *Canadian Geographer*, No. 10:29–39, **1957.** 11 figs., table, 9 refs. **DWB**—A table gives mean monthly and annual wind chill factors for 8 selected Canadian stations (Winnipeg, Churchill, Chesterfield, Baker Lake, Resolute, Alert, Snag, Toronto) and for Bay of Whales and Cape Denison, Antarctica. At the 2 latter stations the factors are about 1600 compared with 1300 for Resolute, Chesterfield and Baker Lake, 1200 for Alert and Churchill, 900 for Winnipeg, 800 for Snag and 700 for Toronto. SIPLE's (1945) wind chill diagram or nomogram is reproduced and was used as the basis for calculations. Yukon Territory has the lowest temperatures, the Canadian Archipelago has the greatest fuel requirements and Keewatin District, N. W. of Hudson's Bay, the greatest wind chill in Canada. Charts of Canada show Jan. mean temperature (isotherms to 5°F), mean wind speed, mean wind chill factor in kg. cal/m²/hr. The latter is given on charts for April, July and October and for year as a whole. Mean annual number of degree days and extreme lowest recorded temperature are also charted. *Subject Headings:* **1. Wind chill, Canada 2. Canada 3. Canadian Arctic.**—*M.R.*

GUSTINESS AND TURBULENCE

See also: **Statistical analysis of turbulence** (Craddock et al.), 11.1–137; **Turbulence over the sea** (Sorkina, Gracheva), 11.1–199; **Isotropic turbulence** (Hasselmann), 11.1–200.

11.1–239 551.551.5:629.13

*Farthing, E. D., **Analysis of high level PIREPS during the period Oct. 6–Nov. 6, 1958.** Kansas City, Mo., Trans World Airlines, Meteorology Section, **1959.** 14 p. 2 charts, 13 tables. **DWB** (M51 T772an)—An analysis of approximately 10,000 pilot reports at altitudes of 25,000 ft and above indicates for the period of the year covered by this study that: (1) Clear-air turbulence may be encountered more often than previously suspected, (2) More turbulence may be expected in cirrus cloud than in clear air, (3) The most turbulent altitude band is from 35,000 to 42,000 ft, (4) A terrain influence does exist, but there is no favored geographical region of clear air turbulence, and (5) Clear air turbulence is encountered more often to the south of a jet stream than to the north. Concerning cirrus cloud, it is noted that both bases tend to be lower and vertical thickness greater with increasing cloud amount. *Subject Headings:* **1. Clear air turbulence 2. Pilot wind reports.**—*Author's abstract.*

11.1–240 551.551.5:551.513.2:551.557.5:629.13

*Fetner, Mary W. (*Langley Aeron. Lab., Langley Field, Va.*), **Summary of locations and extents of turbulent areas encountered during flight investigations of the jet stream from Oct. 1953 to May 1954 and Nov. 1954 to July 1955.** *U. S. National Advisory Committee for Aeronautics, Research Memorandum* L55H04a, April 2, **1956.** 10 p. table, 2 refs. **DWB** (629.1308 U585rm)—Data from 36 flights (October 1953–July 1955) of a Boeing B-47 B experimental plane probing the jet stream at 25,000–40,000 ft in the southeastern part of the U. S., and the Sierra Wave are analyzed. The data were obtained for the A.F.C.R.C. with cooperation from the N.A.C.A. in furnishing turbulence measuring equipment and making the analysis of extent of turbulent areas and height where turbulence was encountered. Notes on gust velocities recorded are included. *Subject Headings:* **1. High level turbulence data 2. Jet stream turbulence 3. United States.**—*M.R.*

11.1–241 551.551.5:551.513.2:551.557.5(41/42)

Georgii, Walter, **Problemi riguardanti la struttura e la turbolenza dell corrente a getto.** [Problems concerning jet stream structure and turbulence.] *Rivista di Meteorologia Aero-*

nautica, Rome, 18(3):3–17, July/Sept. **1958.** 14 figs., 3 refs., 3 eqs. Italian, French, English and German summaries p. 3. **DLC**—Data from balloon soundings, Comet flights originating in the British Isles, and from radar observations (1949–57) are analyzed to show the jet stream relationship to high level turbulence. Wind and temperature structure, tropopause relationships, orographic effects, etc. are examined and illustrated by means of high level maps, cross sections, etc. Two types of turbulence, thermoconvective and shear turbulence, are considered. RICHARDSON'S criteria can be used in calculating turbulence parameters from lapse rates, etc. Maximum gusts of ±10 m/s are used to calculate stresses of jet planes flying in the jet stream. *Subject Headings:* **1. Jet stream turbulence 2. High level turbulence 3. British Isles.**—*M.R.*

11.1–242 551.511.6:551.551:533.15

Siffert, Raymond K. (*Univac Div., Sperry Rand Corp.*), **Richardson number in a compressible flow problem: preliminary note.** *Journal of Meteorology*, 15(1):122–124, Feb. **1958.** 4 refs., 21 eqs. **DWB, DLC**—A. GOLDSTEIN showed in 1931 that if the Richardson number is $< \frac{1}{4}$, the disturbance at an interface of a stratified incompressible fluid will be unstable, whereas it will be stable if $> \frac{1}{4}$. The author develops the standard perturbation equations to show that the same law applies to compressible fluids. *Subject Headings:* **1. Richardson's number in compressible flow 2. Turbulent flow.**—*M.R.*

11.1–243 551.551(71)

Thomas, Morley K. and Boyd, D. W., **Computed maximum wind gust speeds.** *National Research Council of Canada. Div. of Building Research, Building Note*, No. 35, Feb. **1958.** 5 p. tables, 3 refs. **DWB** (M51 N277co)—Maximum wind gust speed (which lasts only a few seconds) is the highest wind speed that occurs, on the average, once in a given number of years. This communication includes a list of Canadian stations where the maximum wind gust speeds have been determined for a period of thirty years. The computed maximum gust speeds were based on reported hourly mileage whenever such records were available. There are a few stations in Canada where anemometers are connected to the apparatus for measuring wind gusts. *Subject Headings:* **1. Maximum gusts 2. Gust calculations 3. Canada.**—*N.N.*

11.1–244 551.551.5:551.557

*Estoque, Mariano A., **Some characteristics of turbulence at high altitudes.** *U. S. Air Force-Cambridge Research Center, GRD Research Notes*, No. 4, Dec. **1958.** 11 p. 5 figs., table. **DLC**—Turbulence data obtained at altitudes of 23,000 to 60,000 ft by the GRD Project Jet Stream and the NACA-AWS groups using instrumented aircraft are analyzed as an initial attempt to construct a synoptic climatology of high altitude turbulence. Statistical characteristics of turbulence in and outside of the jet steam region are presented. The parameters examined are the horizontal extent of turbulent areas and of the intervening nonturbulent areas, the maximum gust velocity in a turbulent area, and the percentage of flight time in turbulent air. *Subject Headings:* **1. High level turbulence 2. Turbulence data.**—*Author's abstract.*

WIND VARIATIONS

See also: **Wind variations, Netherlands lightships** (Verploegh), 11.1–31.

11.1–245 551.553 551.507.321.2

Longley, Richmond W. (*Met. Branch, Canada*), **Observations on a wind anomaly near the earth's surface.** *American Meteorological Society, Bulletin*, 40(4):190–191, April **1959.** 2 figs., 2 refs. **DWB, DLC**—The results of the observations by double theodolites on 10 pairs of pilot balloons released during an 80-min period are described. These showed variations of the wind speed and direction below 3000 ft, both with height and time. The results are not related to the nocturnal inversion as are those of other observers of the same phenomenon but can be attributed only to the lack of uniformity of the wind field under certain conditions. *Subject Headings:* **1. Wind anomalies 2. Wind variations 3. Pilot balloon observations.**—*Author's abstract.*

11.1–246 551.553.11(477.9) 551.507.321.2

Potapov, N. S., **Brizovaia tsirkuliatsiia na iuzhnom beregu Kryma.** [Breeze circulation on the southern shore of Crimea.] *Akademiia Nauk SSSR, Morskoĭ Gidrofizicheskiĭ Institut, Trudy*, 8:98–108, **1956.** 11 figs., 3 refs. **DLC**—Methods and results of studies of breeze circulation carried out in 1949–50 by the Laboratory of Aerology of the Maritime Hydrographic Institute at Kats'veli, on the southern tip of the Crimean Peninsula, by means of pilot balloon observations (with 2 theodolites), vertical soundings to 800–900 m with a captive balloon, and observation of the flow structure with pilot balloons are described and discussed. *Subject Headings:* **1. Sea breeze circulation 2. Pilot balloon observations 3. Crimea.**—*A.M.P.*

11.1–247 551.553.11(480)

*Rossi, Veikko, **Land- und Seewind an den finnischen Küsten.** [Land and sea breezes on the Finnish coast.] *Finland. Ilmatieteellinen Keskuslaitos, Toimituksia*, No. 41, **1957.** 17 p. 6 tables, 5 figs., 6 refs. **DWB, DLC**—The diurnal, vertical and horizontal characteristics of land-sea breezes at Ilmala, Finland and at 12 other coastal stations are analyzed thoroughly on the basis of wind, temp., humidity, sunshine, cloud and wind aloft (to 2500 m) data from one or more stations for March through Oct. *Subject Headings:* **1. Land-sea breeze structure 2. Finnish Coast.**—*M.R.*

11.1–248 551.553.12(743)

Davidson, Ben and Krishna Rao, P., **Preliminary report on valley wind studies in Vermont, 1957.** New York. Univ. College of Engineering. Research Div., Contract AF 19(604)1971, Final Report, Nov. **1958.** 54 p. 20 figs., 2 tables, 12 refs., 2 eqs.—A series of experiments, carried out in Vermont during the summer of 1957 and designed to isolate the effects of valley geometry and prevailing wind on the valley-wind system, is described in detail. The valley-plain wind (the classical nighttime wind) dominates the wind regime under clear weather conditions with prevailing wind flows less than 5 to 10 m/sec depending on valley geometry. The direction of the night wind is generally in the valley-plain or headlands-plain direction; the local slope of the valley floor seems to play a role only in the early development of the night wind. The top of the valley-plain wind is approximately at the height of the surrounding ridge lines and maximum velocities are on the order of 2–6 m/sec. There is definite evidence of down-valley acceleration in both wind speed and mass transport. There is little convincing evidence that the classical up-valley flow is a dominant feature of the valley-wind system except perhaps for very narrow valleys or under very low prevailing wind speed conditions. Down-slope winds on the valley sides during night hours are very much in evidence; confirmed up-slope winds on the valley sides during high sun hours occur only sporadically, if at all. *Subject Headings:* **1. Valley winds 2. Vermont.**—*Authors' abstract.*

11.1–249 551.553.12

Dobryshman, E. M., **O vetre sklonov nad termicheski neodnorodnoĭ podstilaiushcheĭ poverkhnost'iu.** [Slope winds over thermally inhomogeneous underlying surfaces.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy*, No. 43(70):49–56, **1956.** 3 figs., 4 refs., 16 eqs. **DWB, DLC**—A theoretical mathematical investigation of atmospheric motion over a flat inclined underlying surface with a varying temperature under conditions allowing the Coriolis force to be regulated and the surface temperature of the slope depending only upon the longitudinal coordinate x. The case of any temperature distribution of an underlying surface is analyzed within the framework of a linear problem. The initial system of equations of motion and heat advection is written in the form:

$$0=\frac{\partial}{\partial z}\nu\frac{\partial u}{\partial z}-\frac{1}{\bar{\rho}}\frac{dp}{\partial x}+g\beta T\sin\alpha(x) \qquad 0=\frac{\partial}{\partial z}k\frac{\partial T}{\partial z}-\Gamma w\cos\alpha(x)-\Gamma u\sin\alpha(x)$$

$$0=-\frac{1}{\bar{\rho}}\frac{dp}{\partial z}+g\beta T\cos\alpha g\beta(x) \qquad \frac{\partial\mu}{\partial x}+\frac{\partial w}{\partial z}=0.$$

In these equations, u, w = velocity components on the x and z axis respectively; p, T = deviation of pressure and temperature of the system from a condition of rest; Γ = vertical gradient of potential temperature; ρ = density of air at rest; g = acceleration of gravity; β = coefficient of

heat expansion of air; ν and k=coefficients of vertical diffusion for quantity of motion and heat; and $\alpha=\alpha(x)$ angle of inclination of relief to the horizon; the limiting conditions are as follows: $z=0$, $u=w=0$, $T=F(x)$- a known function, $z\to\infty$, u, p, T-bounded. The process of interaction of the slope wind with the breeze wind over the slope is investigated as a linear problem. *Subject Heading:* **1. Slope wind theories.**—*I.L.D.*

11.1–250 551.553.12:551.554(480)

Krishna Rao, P., **Investigation of theoretical and observational aspects of valley winds.** N. Y. Univ. College of Engineering. Research Div. Dept. of Meteorology and Oceanography, Contract DA-36-039-sc-78091, Phase 1, Quarterly Progress Report, No. 1, Oct. 1–Dec. 31, **1958.** 25 p. 10 figs., table, 13 refs. **DWB** (M53.12 N532an)—Observations taken in Vermont valleys during the summer of 1957 are compared with the theoretical model given by GLEESON. The observations do not agree well with the theory and it is doubtful that the GLEESON hypothesis correctly accounts for the physical origin of the night-time valley wind. Some examples of the vertical shear at the top of the valley wind system are given. Shears as high as 10^{-1} sec^{-1} have been observed. The magnitude of the shear depends on the strength of the valley wind, the strength of the prevailing flow and the orientation of the valley axis with respect to the prevailing flow. A detailed study of the breakdown of the valley wind system after sunrise is made. The system dissipates from above and is related to the descent of gradient flow into the valley. *Subject Headings:* **1. Valley winds 2. Vertical wind shear 3. Vermont.**—*Author's abstract.*

11.1–251 551.553.12:551.556:634

Runge, F., **Windgeformte Bäume in den Tälern der Zillertaler Alpen.** [Wind deformed trees in the valleys of the Zillertaler Alps.] *Meteorologische Rundschau,* 11(1):28–30, Jan./Feb. **1958. DWB, DLC**—Contrary to the general expectation that wind formed trees are rare in valleys of hilly country, owing to protection against the wind provided by such localities, the author found numerous trees and shrubs showing distinctly the influence of the wind in the valleys of the Zillertaler Alps. A description of the "true" Zillertaler Valley and of the other valleys and of the individual instances of wind formed trees is given. In the various valleys numerous wind formed trees, which follow exactly the course of the valley, were observed. In all these valleys, regardless of the direction of the valleys, the trees and shrubs are influenced by winds that blow upwards in the valley. The trees are distinctly but not greatly deformed. Since the branches and trunks of the trees are only slightly bent and do not bend in a given direction their form of growth can be affected only by winds prevailing over a long period. The effect of the wind is most noticeable in trees standing in an almost level valley meadow. The deformation is brought about by the valley wind since the mountain wind is much weaker. The wider is the level valley meadow the more effective is the strong wind blowing upwards in the valley. *Subject Headings:* **1. Wind deformed trees 2. Valley wind effects on tree formation 3. Zillertaler Alps.**—*I.L.D.*

11.1–252 551.553.12:551.584.3:551.551

Yoshino, M. (*Tokyo Kyoiku Univ.*), **Winds in a V-shaped small valley: a microclimatological study on the eddies formed in a small valley.** *Journal of Agricultural Meteorology,* Tokyo, 13(4):129–134, May **1958.** 2 figs., 4 tables, 11 refs. In Japanese; English summary p. 134. **DWB**—An investigation was made during July 27–31, 1957, in a small V-shaped valley dissecting Sugadaira high land, Nagano Prefecture. (I) When the prevailing upper winds blow across the valley, the following results were noticed: (a) Ratio of the wind speed at the valley stations to that at the station situated on the horizontal high land surface is smaller at night than in the daytime. It is the smallest generally in the valley bottom and becomes larger at the upper edge of the valley side slope. (b) Deviation of the wind direction from the prevailing winds reached almost 90° at the lower part of the valley slope and had a diverse component in the valley bottom. From these circumstances the eddies formed in the valley seem to be distorted in the valley bottom. (c) The ratio of the wind speed at the valley stations depended upon the prevailing wind speed, but an inverse relation in the daytime and a positive relation at night was found. This is caused by the development of relatively strong valley winds and the weak mountain winds in this region. (d) The eddies in the valley were produced even under the low speed (1–2 m/s at 1 m height) of the prevailing wind and ir-

respective of time of day or night. (II) When the prevailing wind direction coincides with the running direction of the valley, the wind speeds are almost the same in the valley bottom as on the open horizontal land. In some cases, however, the former was stronger than the latter. Especially, the station located where the valley bottom becomes narrow had an anomalously wide fluctuation of wind direction and a relatively strong wind speed. *Subject Headings:* **1. Valley winds 2. Valley microclimatology 3. Winds in V-shaped valleys 4. Eddies 5. Nagano Prefecture.**—*Author's abstract.*

11.1–253 551.553.5:551.554

†DeMarrais, Gerard A. (*U. S. W. B.*), **Wind-speed profiles at Brookhaven National Laboratory.** *Journal of Meteorology*, Boston, 16(2):181–190, April 1959. 3 figs., 9 tables, 15 refs., 4 eqs. **DWB, DLC**—Wind speed profiles are determined for a 114 m layer and two continuous parts of that layer through the use of data from the 125 m meteorological tower at Brookhaven National Laboratory. Further analysis of the data indicates that some variations in the profiles can be attributed to differences in wind speed and direction. A comparison of results obtained through the use of the power law and the logarithmic law shows that the former more accurately fits the data. The profiles determined in this study are found to be in agreement with those found in an independent investigation made at Brookhaven. The results of this investigation are also compared with those obtained at ten other locations. *Subject Headings:* **1. Wind speed profiles 2. Brookhaven National Laboratory, Upton, N. Y.**—*Author's abstract.*

11.1–254 551.553.6

*Bushnell, R. H. (*Goodyear Aircraft Corp.*) and Huss, P. O. (*Univ. of Akron*), **A power spectrum of surface winds.** *Journal of Meteorology*, Boston, 15(2):180–183, April 1958. 3 figs., 7 tables, 8 refs. **DWB, DLC**—The survey of the power spectrum of surface winds was made by reducing wind data near the surface of the earth and by calculating the power spectrum "by finding the variance of velocity $\sigma^2(i/j)$ as a function of i and j, two lengths of time intervals, and then dividing by the corresponding bandwidth $(\frac{1}{2}i)-(\frac{1}{2}j)$, and finally assigning the result to the midfrequency $\frac{1}{2}[(\frac{1}{2}i)+(\frac{1}{2}j)]$." The variance was found from the formula

$$\sigma^2(i/j)=\sigma^2(i/k)-\sigma^2(j/k)$$

the deviation of which is given in an appendix. The spectrum extends from 10^{-8} cps to 1 cps and over much of this band it has the form $af^{-1.4}$. Graphs showing the normalized power spectrum of surface winds and tables giving the scalar wind data used are presented. *Subject Heading:* **1. Wind variance analyses.**—*I.L.D.*

11.1–255 551.553.6(729.5)

*Colón, José A. (*U. S. W. B. San Juan, Puerto Rico*), **A study of surface winds in the vicinity of Mayaquez, P. R.** San Juan, Puerto Rico, U. S. Weather Bureau, Jan. 1958. 11 p. 3 figs., 5 tables on 34 unnumbered pages. Reproduced from typescript. **DWB** (M53/729.5 U587st)—A detailed analysis of wind regime at an airport on the west coast of the island of Puerto Rico (which lies in the easterly trades) for the purpose of establishing an atomic energy plant. Records for February 1950 to February 1957 are used; >18,000 hourly observations for 5 a.m. to 6 p.m., local time. Aerological observations made at San Juan are analyzed by seasons (easterlies make up 92%, 86%, 98% and 89% of the winds at 5000 ft in the 4 respective seasons, but at 30,000 ft westerlies occur 53% of the time, and at 40,000 ft 64% of the time in summer). Nocturnal flow and temperature and rainfall means and extremes are also considered. *Subject Headings:* **1. Nuclear reactor site surveys 2. Wind frequency studies 3. Climate of western Puerto Rico 4. Mayaquez Airport, P. R.**—*M.R.*

WIND DISTRIBUTION

See: **Drag recorder** (Vehrencamp), 11.1–161.

SPECIAL WINDS AND WIND EFFECTS

See also: **Wind erosion** (Tanaka et al.), 11.1–116; **Windbreak effectiveness in orchards** (Van Rhee), 11.1–119; **Shelter belt effects** (Mirotvorskaia), 11.1–127; **Rotor flow in lee of mountains** (Kuettner), 11.1–230; **Wind effects on trees** (Runge), 11.1–251.

UPPER AIR WINDS

See also: **Flying jet winds** (Chandler), 11.1–112; **Upper air wind forecasts** (Graham), 11.1–113; **Radar obs. of upper air winds** (Ervet), 11.1–136; **Upper air wind computation** (Davies), 11.1–138; **Radar meas. of upper air winds** (Robuchon, Ervet), 11.1–142; **Tropopause-jet stream relationships** (Defant), 11.1–184; **Jet stream** (Pogosian), 11.1–208; **Subtropical jet stream** (Radok, Clarke), 11.1–209; **Relation between pressure fields and motion** (Vitek), 11.1–234; **Jet stream turbulence** (Fetner), 11.1–240; **Jet stream** (Georgii), 11.1–241; **High level turbulence** (Estoque), 11.1–244.

11.1–256 551.557.5

Raethjen, P. (*Univ. of Hamburg*), **Trägheitsellipse und Jet Stream.** [Inertia ellipse and the jet stream.] *Geophysica*, Helsinki, 6(3/4):439–453, **1958.** fig., table, 5 refs., 20 eqs. German summary p. 439. **DWB, DLC**—Orographically or thermally induced disturbances in the gradient wind balance (Störbeivegung) are considered in relation to surface friction, inertia, vertical oscillations, jet streams, shearing and the inertial-ellipse. A dynamic model and synoptic examples leading to cyclogenesis are presented and discussed. The entire treatment is mathematical, i.e., one which could be applied to numerical prediction, either graphically or in computers. *Subject Headings:* **1. Numerical models including orographic effect 2. Gradient wind jet 3. Inertial jet stream.**—*M.R.*

VERTICAL MOTION

See: **Lee waves** (Wallington), 11.1–231.

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY

See: **Precipitable water** (Keitz et al.), 11.1–152; **Moisture balance** (Orlova), 11.1–175.

EVAPORATION AND EVAPOTRANSPIRATION

See: **Nieve penitente** (Amstutz), 11.1–269.

CONDENSATION

See also: **Dew bibliogs.** (Stone), 11.1–84; **Icing of aircraft** (Gray), 11.1–114.

FOG AND CLOUDS

See: **Fog data, Shannon Airport** (Dixon), 11.1–115; **Radar obs. of radioactive clouds** (Richards, Watson), 11.1–140; **Fog forecasting** (George), 11.1–167.

PRECIPITATION

See also: **Drought, U.S.S.R.,** 11.1–6; **Forest-hydrological investigations, Upper Harz** (Delfs et al.), 11.1–26; **Precip. data, Yugoslavia,** 11.1–151; **Hourly precip. data** (Keitz et al.), 11.1–152; **Synoptic conditions for rainfall, W. Siberia** (Orlova), 11.1–175; **Precip., San Francisco Peaks, Ariz.** (Colton), 11.1–257; **Flood hydrograph for shower runoff** (Shatberashvili), 11.1–271.

11.1–257 551.577.2(791):551.506.3

*Colton, Harold Sellers, **Precipitation about the San Francisco Peaks, Arizona.** *Northern Arizona Society of Science and Art, Flagstaff, Arizona, Museum of Northern Arizona Technical Series*, No. 2, Jan. **1958.** 18 p. fig., map, charts, 7 tables. **DWB** (M77.2/791 C725pr)—

Precipitation records are presented for five ecological zones in Arizona with data from seventeen weather stations. Experiments conducted from 1932 through 1956 aim at improving the growth of Hopi corn in this arid region, as well as obtaining systematic weather information and the effects of altitude and general topography. Results showed annual precipitation to range from about 6 in. to about 22 in., depending on elevation. A summary, as well as the analysis of observations, are offered. *Subject Headings:* **1. Precipitation records 2. Rainfall amount 3. San Francisco Peaks, Ariz.**—*N.N.*

11.1–258 551.577.2/3:63(52)

Kusakabe, M. (*Fukuoka District Met. Obs.*), **Precipitation of the consecutive months at Fukuoka, from the viewpoint of agricultural meteorology.** *Journal of Agricultural Meteorology*, Tokyo, 13(2):49–52, Oct. **1957.** fig., 3 tables, 2 refs. In Japanese; English summary p. 52. **DWB**—From the view-point of agricultural meteorology, total amount of precipitation for consecutive months is very important. Table 1 shows precipitation of consecutive months at Fukuoka, 1890–1955 as well as mean value, standard deviation, observed minimum and maximum of any consecutive months (1∼11 months). Table 2 shows precipitation of irrigation period, nonirrigation period and Bai-u (rainy season). The amounts of precipitation in June, July and September, or the precipitation caused by Bai-u and typhoon, are predominant in the precipitation of the irrigation period. Precipitation in Bai-u is the most valuable from the agricultural viewpoint, it accounts for 25–55% of the irrigation period precipitation. Fig. 1 shows the relation between precipitation in June and July and precipitation in Bai-u. Agricultural damage, which have close relation to the precipitation of consecutive months, consists of drought damage to paddy rice and upland rice, and drought damage and wet damage to wheat and barley. Table 3 shows precipitation of the consecutive months, which cause this agricultural damage. *Subject Headings:* **1. Precipitation amounts 2. Consecutive months of precipitation 3. Bai-u 4. Agricultural meteorology 5. Fukuoka, Japan.**—*Author's summary.*

11.1–259 551.577.31:551.577.37(52)

Watanabe, Kazuo (*Tokyo, Japan*), **The diurnal variation of precipitation.** *Weather Radar Conference, 7th, Miami Beach, Florida, Nov. 17–20, 1958, Proceedings*, issued **1958.** Sec. H:33 37. 5 figs. **DWB** (M01.81 R124pc)—The diurnal variation of precipitation associated with typical "cloudburst" conditions in Japan is analyzed and discussed. The similarity of situations conducive to severe storms in the central United States is noted and an example analyzed. Attention is drawn to the importance of such diurnal variation, due to variations in stability, in precipitation forecasting. The value of radar climatological studies in this field is stressed. *Subject Headings:* **1. Diurnal precipitation variations 2. Cloudbursts 3. Precipitation forecasting 4. Japan.**—*Author's abstract.*

11.1–260 551.577.32:551.579:551.482(45)

Gherardelli, Luigi, **Caractéristiques de la variabilité des apports météoriques et des débits annuels dans les bassins hydrographiques Italiens.** [Characteristics of annual precipitation and runoff variability in Italian river basins.] *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 1957*, [*Transactions*], Vol. 3, pub. **1958.** p. 188–193. fig., 2 tables, eqs. French résumé p. 188. **DWB** (M(06) 1611g)—Many of the Italian river basins have been studied and a report is given of the meteorological factors which cause variation in the annual precipitation and runoff data. The northern, central and southern basins, as well as those in the islands of Sicily and Sardina, were under study. *Subject Headings:* **1. Precipitation-runoff relationships 2. Annual precipitation variations 3. River basin studies 4. Italy.**—*N.N.*

11.1–261 551.577.33:551.588.2(234.12)

Michel, A., **Variations saisonnières de la pluviosité avec l'exposition et l'altitude dans le massif du Canigou.** [Seasonal variations of rainfall with exposure and height in the Canigou Massif.] *Revue Forestière Française*, Nancy, No. 8/9:558–562, Aug./Sept. **1958.** fig.—From 1950 to 1957 surveys have been based on the results gathered by the forestry department controlling many snow and rain measuring stations. Canigou is a 2785 m high range close

to the western Mediterranean. Rainfall difference between leeward and windward slopes was known before. But annual rainfall on the weather side does not seem to increase when it is over 1000 m high. Seasonal surveys show the influence of storms on this phenomenon. On the lee side, rainfall regularly increases with height in any season. *Subject Headings:* **1. Seasonal rainfall variations 2. Rainfall variations with height 3. Orographic influences 4. Canigou, Pyrenees.**—*A. V.*

11.1–262 551.577.37:551.579.4:627.51(262)

Quesnel, B., **La protection contre les inondations sur les cours d'eau tributaires du bassin méditerranéen.** [Protection against floods on river tributaries of the Mediterranean Basin.] *Académie d'Agriculture de France, Paris, Comptes Rendus*, 45(5):192–198, March 4, **1959. DLC**—Floods in Mediterranean countries are always devastating owing to intensity and abundance of precipitation. It is not unusual to collect 60 mm of water in 1 hr, 85 mm in 24 hrs and 140 mm in 3 days. Experiments using models to determine the effect of planting brushwood on river banks which overflow are described. These experiments justify the use of brushwood on the banks of rivers whose fall exceeds 1.5/1000 and which have a torrential regime. When the banks are concave, brushwood 25 m wide would be sufficient. *Subject Headings:* **1. Flood protection 2. Mediterranean Basin.**—*A. V.*

11.1–263 551.577.38:551.501

Kaczmarek, Zdzislaw (*Warsaw*), **A method of determining the frequency of droughts.** *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 1957,* [*Transactions*], Vol. 3, pub. **1958.** p. 40–49. 3 figs., 5 tables, 9 refs., 19 eqs. **DWB** (M(06) I611g)—The drought Q_{min} defined as the least value of the daily discharge Q throughout the year, has an asymptotic frequency distribution $F(Q_{min})$, dependent only on the type of the distributing function $F(Q)$. Assuming that: a) the distribution of daily flows is bounded from below, i.e., the distributing function $F(Q \leq \epsilon) = 0$; b) the density function at point $Q = \epsilon$ is equal to zero and its derivative at that point is not equal to zero, the author works out an asymptotic nonparametric distribution of the reduced variable $y = (Q_{min} - \epsilon)/k$, or a distribution of minimal flows characterized by two parameters, ϵ and k, estimated from a sample by the method of moments. He constructs a probability scale permitting the linear representation of the distribution of values Q_{min} with a given frequency p, dependent on the estimated parameters, which is also an estimate of the real value $F(Q_{min})$. In order to determine the efficiency of the estimation, an asymptotic distribution of the value Q_{min_p} is introduced, permitting the determination of a confidence interval on an arbitrary confidence coefficient α. A numerical example illustrates the application of the method in question. *Subject Heading:* **1. Drought frequency determination.**—*Author's abstract.*

RAIN, SNOW AND HAIL

See also: **Snow utilization and control,** 11.1-4; **Avalanche forecasting** (Tushinskiĭ), 11.1–36; **Snow, ice and permafrost bibliogs.,** 11.1–81; **Heat requirements for a snow melting system** (Chapman), 11.1–128; **Radar precip. stalactites** (Imai), 11.1–139; **Hail suppression** (Frank), 11.1–182; **Effect of snow reflected radiation on thermocouples** (de Percin), 11.1–218; **Forest influences on snow accumulation** (Anderson et al.), 11.1–288.

11.1–264 625.7:656.11:551.578.46

Zingg, Theodor, **Die Schneeverhältnisse der Alpenstrassen.** [Snow conditions on Alpine roads.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 136:93–94, **1956.** 2 tables. **DWB, DLC**—Summarizes the results of a study of the snow conditions on the southward-leading passes; namely: the Great St. Bernard, St. Gotthard and San Bernardino. These passes are within the climates characterizing both sides of the Alps so that there are few days without precipitation. At best, the passes are free of obstruction due to precipitation 55 out of 180 days. On the St. Gotthard route the snow cover, below 1800–1900 m above sea level, lasts longer than on San Bernardino and on the Great St. Bernard route. Also the avalanches occurring on these routes and also on the Simplon route are discussed briefly. Tables containing data on the number of days without precipitation for the stretch Goschenen-

Airolo (St. Gotthard) and Andeer-S. Bernardic village (San Bernardino) for the period 1931–1940, duration of permanent snow cover at various elevations, and on new snow fall during the period November-April are presented. *Subject Headings:* **1. Snow conditions on roads 2. Road trafficability 3. Alpine passes 4. Alps.**—*I.L.D.*

11.1–265 551.578.461:912:355

†Espenshade, Edward B., Jr. and Schytt, S. Valter, **Problems in mapping snow cover.** *U. S. Snow Ice and Permafrost Research Establishment, Research Report*, 27, Dec. **1956.** 92 p. 28 figs., 10 tables, 33 refs. **DWB, DLC**—The results of a study on the feasibility of mapping selected snow-cover characteristics for military purposes, taking into account both current synoptic and average conditions, are reported in detail; and suggestions for improvement in presentation and accuracy are made. Problems associated with the construction of isolines for depicting individual or combinations of snow-cover conditions are discussed; the need for other statistical parameters in addition to the means is stressed; and the adaptation of frequency and variability indices is suggested. The use of a regional technique, which identifies areas somewhat homogeneous or substantially different from adjacent areas, is investigated. Problems in mapping snow density are also considered as well as the possibility of estimating snow density from meteorological data. Three sets of codes for the systematic recording and transmission of data are proposed, including a code for ground observers, a simplified code for use where no instruments or trained personnel are available, and a code for aerial observations. *Subject Heading:* **1. Snow cover mapping.**—*Authors' abstract.*

11.1–266 551.578.462:551.324.433(988)

*†Ahlmann, Hans W.:Son, **Accumulation and ablation on the Fröya Glacier: its regime in 1938–39 and in 1939–40.** (In: **Festskrift tillägnad Vilhelm Bjerknes, den 14 Mars 1942.** Stockholm, Centraltryckeriet, **1942.** p. 1–22. 7 figs., 5 tables, 22 refs.) (At head of t-p: Studies in North-East Greenland, [Pt. 3].) **DWB**—One of a series of studies on the glaciers of Northeast Greenland, aimed at determination of the moisture budget (precipitation, evaporation and melting), the investigation of Fröya Glacier covered July 31 to Sept. 4, 1939. Data for each 4 hours to Aug. 18 are tabulated and values of ablation shown on graphs. Snow left over from winter 1938–39, accumulation and ablation 1939–40, comparison with other places around the Norwegian Sea, the regime in the years 1938–39 and 1939–40, etc. are discussed in separate parts of the article. The same methods were used in determining ablation as were used in Spitsbergen in 1934, and on Vatnajökull in 1936–38. The ablation decreases rapidly with altitude from 200–600 m as shown on graph, but decreases little from 600–1200 m elevation. Ablation is great in sun and little or none at night or in shade. Greatest ablation was on a day when rain fell. On the lower parts of the glaciers convection is more important than radiation in producing ablation; in the upper parts both are insignificantly small. The accumulation of ice in the upper parts and on the ice cap is due to lack of ablation and in spite of the small precipitation, the reverse is true in Iceland. In 1938–39 a considerable surplus was calculated for Fröya Glacier; in 1939–40 a 30% deficit occurred. The firm line is at 800 m elevation during the present stage of recession and thinning on Fröya Glacier. In 1939–40 the accumulation and ablation at the firm line was 28 cm of water. *Subject Headings:* **1. Glacier accretion 2. Glacier ablation 3. Fröya Glacier, N.E. Greenland. 3. Northeast Greenland.** —*M.R.*

11.1–267 551.578.462(470)

Grishin, I. S., **Vliianie erozionnogo raschleneniia na raspredelenie snezhnogo pokrova v basseĭne r. Dona.** [Influence of erosional dissection on snow cover distribution in the Don Basin.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 1:91–97, Jan./Feb. **1958.** 3 figs., 6 refs. **DWB**—The Don Basin is notable for its small amount of forest cover and its great erosional dissection (as depicted by charts of average slope of surface, and of density of network of erosional gullies), which has a marked effect on snow cover. It was found by mapping the snow cover in relation to erosion that the distribution of snow cover is very irregular, depending on geographic location and local climatic conditions, and on micro-relief. The most severely eroded regions show the least snow cover and the least eroded regions a heavier snow cover which depends on climatic zones. A chart shows the average (1936–56) water

supply in the snow cover, which varies from <30 mm in highly eroded southwest portion to <70 mm in eroded northwest, and >110 mm in less eroded northeast portion. *Subject Headings:* **1. Gully effects on snow cover 2. Snow cover in Don Basin 3. Don Basin, European U.S.S.R.**—*M.R.*

11.1–268 551.578.463

de Quervain, M. R., **On metamorphism and hardening of snow under constant pressure and temperature gradient.** *International Union of Geodesy and Geophysics. Assoc. of Scientific Hydrology, Toronto, Sept. 1957,* [*Transactions*], Vol. 4, pub. **1958.** p. 225–239. 20 figs., table. **DWB, DLC**—The different development of a fresh snow layer under a heavy or light load of superimposed snow is well known. It is also known that the change of the structure and in particular the development of strength is the result of a combined action of pressure, temperature gradient and temperature. The formation of certain types of avalanches is greatly related to this phenomenon, as well as the behavior of compacted snow banks and underlying strata. In a simple set of experiments carried out in the laboratory, it is shown how certain properties of snow change with time, when kept under various conditions of pressure and temperature. *Subject Heading:* **1. Snow metamorphism.**—*Author's abstract.*

11.1–269 551.578.467:551.573

†Amstutz, G. C. (*Missouri School Mines and Metallurgy, Rolla, Mo.*), **On the formation of snow *penitentes*.** *Journal of Glaciology,* Cambridge, 3(24):304–311, Oct. **1958.** fig., 7 photos, 16 refs. English and German summaries p. 304. **DWB, DLC**—Explanation for the development of snow penitents. It is based on analysis of the literature and the author's new ideas resulting from his observations of snow penitentes at Tutupaca Volcano, Peru. The pro's and con's of several physical processes and theories related to the subject are discussed. The odd shapes assumed during the development of the penitents are attributed to radiation or more specifically, the energy of the trapped light. The formation of penitentes at Tutupaco Volcano was associated with a prevailing slight breeze of no fixed direction. *Subject Heading:* **1. Nieve penitente.**—*W.N.*

11.1–270 551.578.71:632.116.3

Dessens, Henri, (**Comment on**) **R. Genève: Le contrôle de la lutte contre la grêle.** [Control of the fight against hail.] *Puy-de-Dôme. Observatoire, Bulletin,* No. 3:89–92, July/Sept. **1958. DWB**—In an earlier article (*see* 10.11–212, Nov. 1959, *MAB*), R. Genève examined statistically the following factors: probability of hail during a thunderstorm; diameter of hailstones; duration of hail. No significant variations for any of these factors were found as a result of seedings with AgI nuclei. The author does not criticize this result, but points out that the selected tests do not and will not permit estimation of the success of experiments in cloud seeding in the fight against hail. In spite of the nonsignificant results, the author gives reasons for continuing the experiments and gives some information on the present aspect of research regarding hail. *Subject Headings:* **1. Hail structure 2. Hail control 3. Cloud seeding with silver iodide.**—*A.V.*

HYDROMETEOROLOGY

See also: **Forest-hydrological investigations, Upper Harz** (Delfs et al.), 11.1–26; **Hydromet. research, Zeya and Bureya River Basins** (Podvishenskaia), 11.1–28; **Hydrologic data control** (Langbein, Hoyt), 11.1–30; **Hydrology conf.,** 11.1–67; **Hydromet. education** (L'vov), 11.1–70, **Hydrology bibliogs.,** 11.1–85, 11.1–86; **Forest effects on snow melt** (Rakhmanov), 11.1–126; **Soil moisture tension** (Hacia), 11.1–164; **Precip.-runoff relationships** (Gherardelli), 11.1–260; **Flood protection** (Quesnel), 11.1–262.

11.1–271 551.579.4:551.577.37

Shatberashvili, P. A., **Gidrograf pavodka pri raschetakh livnevoĭ kanalizatsii.** [The flood hydrograph in calculations of shower drainage systems.] *Meteorologiia i Gidrologiia,* No. 11:40–41, Nov. **1956.** fig., 2 refs., 3 eqs. **DWB, DLC.** Transl. into English as **Hydrographs of floods in the analysis of cloudburst canals.** Available for ref. U. S. Weather Bureau

Library. 3 p. fig., etc.—The general expression for the area of a hydrograph of any form is written $W = 3600\, Q_{max} t_r (a + b\gamma)$, where Q_{max} = maximum ordinate of the hydrograph; (in m³/sec), $\gamma = t_d/t_r$ = ratio of time of drop to time of rise = $a = \Delta \sum_0^{t_r} \frac{Q}{Q_{max}}$, $b = \Delta \sum_{t_r}^{t_d} \frac{Q}{Q_{max}}$ from the above formula = $Q_{max} = \frac{0.28\, HaF}{t_r(a+b\gamma)}$, where $\frac{1}{a+b\gamma} = f$ is the coefficient of the form of the flood hydrograph. A calculating type hydrograph in relation coordinates is presented. *Subject Headings:* **1. Flood hydrographs 2. Shower runoff.**—*I.L.D.*

11.1–272 551.579.4:551.524(58) 551.579.2(58)

Shcheglova, O. P., **O talykh i dozhdevykh pavodkakh na rekakh Sredneĭ Azii.** [Meltwater and rain floods on the rivers of Central Asia.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:40–43, **1958.** 2 figs., 2 refs. **DWB, DLC**—By using running averages it is possible to establish a good relationship between atmospheric temperature and river discharge; the temperature index may be the air temperature at 13 h. The optimum period of averaging must be established individually for each river. The absence of a relationship for short intervals and its presence for 3–5 days and longer periods indicates the minimum time it takes the meltwater to reach the collecting point. For the Karakyl'dzha and Isfara Rivers graphs are constructed showing the relationship between meltwater flow and temperature [$Q = f(t)$], and the various periods of the life of the river are analyzed. The establishment of the relationship $Q = f(t)$ for rainless periods enables the construction of a hydrograph of meltwater runoff for periods of precipitation runoff which destroys the smooth course of the dependence of discharges upon atmospheric temperature. An example of such a rain flood for the Naryn River is analyzed; by comparison of the $Q = f(t)$ relationship for the Vakhsh River, which did not have a rain flood at the same time, it is possible to obtain the ordinate of rain flood and its total either indirectly from the hydrograph after excluding the meltwater hydrograph or by analyzing the differences between discharges of meltwater and rainwater. The application of the procedure for the rivers of Central Asia is discussed with the aid of specific examples. *Subject Headings:* **1. Temperature-river discharge relationships 2. Snow melt runoff 3. River discharges 4. Central Asia.**—*I.L.D.*

11.1–273 551.579.4(572)

Skorniakov, V. A., **Stok na territorii basseĭna Verkhnego Eniseia.** [Stream-flow in the upper Yenisei Basin.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 6:98–104, **1957.** 5 figs., 2 tables. **DWB**—In connection with the construction of the Krasnoyarsk hydroelectric station (the largest in the world) in the upper Yenisei Basin, the author presents an analysis of the stream flow in the upper Yenisei and methods for determining various elements of the stream flow in the absence of direct hydrometric measurements. A brief general description of the climate and of the hydrography is given. An analysis of the relationship of the mean module of stream flow to height of the basin shows that the gradient of the stream flow module varies from 0.4 to 3.8 liters/sec/km² per 100 m of elevation. Three regions with high stream flow modules are distinguished in the upper Yenisei Basin, namely: (1) the upper basin of the Tuba River at the junction of the western and eastern Sayan; (2) the upper Abakan River; and (3) the southeastern part of the Bei Kem Basin. The lowest module, less than 2 lit/sec km² was observed in depressions off by high ridges from moisture bearing winds. The annual stream flow is closely associated with annual precipitation. The correlation coefficients for the Yenisei (at Bazaikha), Tuba and Mana ranged from 0.87 to 0.96. The intra-annual distribution of stream flow shows that the months with the maximum flow are a function of height of basin in April, May or June. A second maximum is observed in many rivers in August or September. The monthly minimum occurs in February or March. The summer-fall stream flow shows a smaller correlation coefficient with precipitation than the spring stream flow. The ratio of the mean maximum of the former to the latter varies from 0.23 to 0.66. The winter stream flow is characterized by extensive underwater ice. Maps showing the mean annual stream flow for the various regions and the distribution of types of seasonal stream flow, graphs giving the seasonal distribution of stream flow as a function of basin height, the dependence of mean module of stream flow upon basin height and numerical data in tables and

in the text are presented. *Subject Headings:* **1. Stream flow, Yenisei Basin 2. Yenisei Basin, Krasnoyarsk Territory.**—*I.L.D.*

11.1–274 551.588.6:551.579.4:632.187

Sokolovskiĭ, D. L., **O vliianii lesa na rezhim rechnogo stoka.** [Influence of forests on runoff regime.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geogr.*, No. 3:98–113, **1958.** 2 figs., 12 tables, 17 refs. **DWB**—The following aspects of the problem are taken up and studied separately on the basis of actual observation data found in recent Soviet and foreign literature: 1. Influence of forests on the annual runoff variation and its extreme values; 2. Influence of forests on the total magnitude of the annual runoff; 3. Influence of deforestation on long period runoff variations. It is shown that the influence of forests on river runoff depends on specific geographical conditions of the basin and the type of the runoff (annual and low-water). Numerous tables and graphs illustrate the analysis. *Subject Headings:* **1. Forest effects on runoff 2. Annual runoff variations.**—*A.M.P.*

11.1–275 551.509.5:551.579.4(789,788)

Stockwell, Homer J. (*Soil Conservation Service, Ft. Collins, Colo.*), **Streamflow forecast from snow and rainfall data.** *U. S. Commission for Arid Resource Improvement and Development (ARID), Publication*, No. 1:3–5, **1957.** 2 figs. **DWB** (628.1 A512pr)—Runoff in the Rio Grande is more difficult to forecast than on the west slopes of the Pacific Northwest ranges where summers are dry and snow pack fairly dependable. However, since shower precipitation is rare in the Rio Grande Basin, the uncertainty caused by rainfall after the date of issue of the forecast is not as great as in regions where convective rainfall is heavy. Monthly forecasts are made from January through May, using weighted indexes of previous precipitation and seasonal snow accumulations in the high mountains plus correction for soil moisture under the snow based on fall precipitation (August–October). This latter factor improves forecasts greatly as is shown by two correlograms: 1) April snow cover index and subsequent April–September discharge of Rio Grande at Otorvi Bridge Station and 2) the same plus fall precipitation correction. Colman units are being installed to get a better soil moisture index. *Subject Headings:* **1. Stream flow forecasting 2. Snow melt runoff 3. Otorvi Bridge, New Mexico 4. Rio Grande Basin, Colorado.**—*M.R.*

11.1–276 551.579.4

Wolf, Peter O., **The influence of flood peak discharges of some meteorological, topographical and hydraulic factors.** *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 1957*, [*Transactions*]. Vol. 3, pub. **1958.** p. 26–39. 5 figs., 14 refs., 22 eqs. **DWB** (M(06) I611g)—Disregarding water derived from melting snow and the failure of storage dams, the source of flood flow is storm rainfall. The variation of maximum rainfall intensity with duration is discussed, with special reference to a probability pattern. The factors affecting the flood discharges to be expected from a catchment include the catchment characteristics (area, shape, slope, infiltration capacity, surface-storage capacity); the vegetation; and the dimensions of streams and rivers. The paper discusses the effect of length of the catchment, of curvature of its profiles, and of the channel dimensions. *Subject Headings:* **1. Flood studies 2. Flood producing storms.**—*Author's abstract.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See also: **Military climat., Greenland** (Frost), 11.1–52; **Climat. research** (Gal'tsov), **11.1–147.**

11.1–277 551.58:526.8

Guk, N. I., **K ucheniiu o klimaticheskom kartografirovanii.** [Study of climatic mapping.] *Meteorologiia i Gidrologiia*, No. 10:21–29, Oct. **1956.** 3 figs., 7 refs. **DWB, DLC**—The author describes a method for constructing climatic maps by averaging series of particular isolines over a sufficiently long time. This involves rendering the data homogeneous, recti-

linear interpolation, and comparison of systems of isolines for homogeneity in secular variation. The application of the technique to the construction of isohyet maps of the Ukrainian plain is illustrated. *Subject Headings:* **1. Climatic mapping 2. Cartographic method in climatology.** —*I.L.D.*

11.1–278 551.58:526.8

†Drozdov, O. A., **Kartograficheskiĭ metod v klimatologii.** [Cartographic method in climatology.] *Meteorologiia i Gidrologiia*, No. 2:44–48, Feb. **1957.** 20 refs. **DWB, DLC**—A critical review of various approaches employed in climatic mapping by Soviet climatologists. The general purpose of climatic maps and the importance of the influence of physiographic factors upon the distribution and variation of weather variables is discussed. The advantages and disadvantages of maps giving the distribution of climatic data as a function of the most general elements of the large scale circulation (interlatitudinal differences, etc.), and of large scale maps which provide a real picture of the distribution of climatic elements are considered. With reference to the latter, the author summarizes various procedures for mapping climatic elements and presents in detail N. I. Guk's method for mapping precipitation (*Met. i Gidr.*, No. 10, **1956**; *see* 11.1–277, Jan. 1960, *MAB*). Guk rejects the search for climatic laws, the use of physical laws in mapping and the reduction of the climatic peculiarities to microclimatic characteristics of the stations. Instead he uses empirical, almost mechanical approaches, to the construction of isolines. In order to exclude randomness, Guk postulates homogeneous meteorological fields, utilizes linear interpolation for each year from which secular values of rainfall can be attained by averaging. The system of isohyets for the final map is based upon these isolines. *Subject Headings:* **1. Climatic mapping 2. Cartographic method in climatology** —*I.L.D.*

11.1–279 551.58:526.8

†Petrov, G. N., **O primenenii kartograficheskogo metoda v klimatologii.** [Use of the cartographic method in climatology.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:47–50, Jan. **1958.** 21 refs. **DWB, DLC**—The author points out the inadequacy of small scale climatic maps and points out the need for large scale climatic maps which take into account the effect of local geographic elements upon climate. Specific examples of the effect of landscape characteristics (direction of ground, ruggedness of terrain, including also small scale ruggedness) upon precipitation in various parts of the U.S.S.R. are cited, and the inadequacy of zonal or meridional regionalization of climate is pointed out. For climatic mapping topographic maps on the scale of 1:300,000 and1: 1,000,000 are proposed. The circumstances permitting the use of isolines, rectilinear interpolation, etc. are discussed and it is concluded that realistic climatic maps should not be made for mean annual magnitudes but separately for months or seasons so that the geographical climate characteristics of a region can be taken into account. Satisfactory meteorological data for constructing climatic maps may be obtained by carrying out meteorological surveys in regions surrounding each meteorological station and by establishing climatic profiles. The execution of both these procedures and their application are described. *Subject Headings:* **1. Climatic mapping 2. Cartographic method in climatology.**—*I.L.D.*

CLIMATE OF PARTICULAR PLACES

See also: **Climate, Central Asia** (Murzaev), 11.1–9; 11.1–10; **Climate, Truk** (Stark et al.), 11.1–19; **Climatic data, Netherlands lightships** (Verploegh), 11.1–31; **World weather records** (U. S. W. B.), 11.1–32; **Climate, Yuma and N.W. Africa** (Porter et al.), 11.1–290; **Climate, Yuma** (Robison, Dodd), 11.1–291.

11.1–280 551.582.1(516)

Chu, Bao-Tsian', **Izuchenie osobennosteĭ klimata Sin'tsziana.** [Climatic features of Sinkiang Province.] *Priroda*, No. 11:79–82, Nov. **1958.** table. **DLC**—A summary of the temperature, moisture and wind regime of Sinkiang is presented. The high air temperature of Sinkiang, as compared with that of the northeast plain at the same latitude, is the result of its continentality. The sunshine duration amounts to 2500 3500 hrs per year (60 80% of the total possible). The higher winter temperatures are the result of its elevation. The

Turfan depression, 154 m below sea level, is the hottest place in Sinkiang, since it is almost enclosed. The mean monthly temperature for June, July, and August at the Turfan meteorological station exceeds 30°C; the maximum soil temperature is 75°C; the diurnal temperature amplitude is 20°C. The hot dry summer is followed by a severe freezing winter. In Dzungaria the mean January temperature is below −20°C and the absolute minimum is less than −40°C. Near Ebi Nir Lake in Dzungaria the annual amplitude of temperature attains 50°C and the absolute annual amplitude exceeds 80°C. In the Turfan plain the temperature sum exceeding 10°C ranges between 4000 and 5000°C. The annual precipitation ranges between 10 mm and 50 mm in the Turfan plain or between 10–50 mm/year; while in Chuguchak it is between 3000–500 mm. The maximum rainfall occurs in summer, but only 40% of the annual total. At stations along the western border of Sinkiang most of the precipitation may occur in spring and fall. Precipitation amounts are greater in the mountains than in the lowland regions. The mean annual wind velocity ranges between 1 and 3 m/sec. Depending upon locality and season, wind velocity varies considerably. It is particularly large at the exit from some depressions owing to large differences in pressure; at the Dzungarian gate it is 6 m/sec; in summer it may attain 40 m/sec. In winter the Siberian anticyclone prevails and winds are southerly and southeasterly. In spring and summer, winds blow often during high temperature and low relative humidity. *Subject Headings:* **1. Climate of Sinkiang Province 2. Continentality 3. Climatic summaries 4. Sinkiang Province, China.**—*I.L.D.*

11.1–281 551.582.1(474.5)

*Shchemelevas, V. M., **Nekotorye osobennosti klimata Litovskoĭ SSR v pogodakh.** [Some peculiarities of the climate of Lithuanian S.S.R. with respect to weather conditions.] *Lietuvos TSR Mokslų Akademija. Geologijos ir Geografijos Institutas, Mokslininai Pranešimai*, 5:115–128, **1957.** 10 figs., 13 tables. **DWB**—Climate structure diagrams for several meteorological stations are produced which show weather conditions in Lithuanian S.S.R. The extreme occurrences of weather conditions are indicated and some peculiarities of circulation are explained. *Subject Headings:* **1. Climate of Lithuania 2. Lithuanian S.S.R.**—*Author's abstract.*

11.1–282 551.582.1:551.324.22(828)

†Schwerdtfeger, W., **Ein Beitrag zur Kenntnis des Klimas im Gebiet der Patagonischen Eisfelder.** [Climate of the region of Patagonian ice fields.] *Zeitschrift für Gletscherkunde und Glazialgeologie*, Innsbruck, 4(1/2):73–86, **1958.** fig., 3 tables, 18 refs. English summary p. 85–86. **DWB, DLC**—As there are no meteorological stations in the region of the great ice masses of the southern Cordillera, the characteristics of their climate can be determined only by inductive methods, extrapolation of values observed at the coast of southern Chile, comparison with the conditions of mountains in other parts of the world likewise exposed to strong and permanent currents of maritime air masses. The mean monthly values of temperature at the 2000 m level (Table II) prove remarkably lower than those of the free atmosphere. The average precipitation over the ice masses and their western slopes, estimated by 4 different methods, have the magnitude of 7000 mm (280 in.) per year. *Subject Headings:* **1. Climate of Patagonian ice fields 2. Glacial climates 3. Patagonia, Argentina.**—*Author's abstract.*

CLIMATIC CHANGES

See also: **Climatic changes, S.W. United States,** 11.1–5; **Quaternary and Paleozoic glaciation** (Rukhin), 11.1–105; **Singularities** (Hess), 11.1–202; **Climatic trends, Gt. Brit.** (Glasspoole), 11.1–222; **Weather cycles** (Kolobkov), 11.1–149.

11.1–283 551.326.7:551.583.3:551.590.2

Schell, Irving I. (*Dept. of Geology, Tufts Univ.*), **Theory of ice ages.** *Science*, Wash., D. C., 125(3241):235, Feb. 8, **1957.** 2 refs. **DLC**—Ewing and Donn (1956) advanced an ice-age theory involving melting of ice in the Arctic Ocean which would favor growth of glaciers by increasing precipitation (*see* 7.11–274, Nov. 1956, *MAB*). Schell takes exception to this theory and believes that warming of the Arctic and Atlantic Oceans, shrinkage of Arctic ice pack and de-glaciation all occur simultaneously, due to a general warming of extraterrestrial origin. *Subject Headings:* **1. Ice age theories 2. Glacial periods 3. Extraterrestrial influences.**—*G.T.*

11.1–284 551.583.3:551.583.7

Termier, H. and Termier, G., **Les grandes phases arides des temps géologiques. Leur place dans l'histoire de la terre, et leurs répercussions sur l'histoire de la vie: exemple du Permien.** [The great arid periods of geologic ages: their place in the earth's history and their repercussions on the history of life: example from the Permian.] *Revue Générale des Sciences Pures et Appliquées*, Paris, 65(3/4):83–91, March/April **1958.**—Summary of research in paleogeography and paleoecology, particularly during periods of aridity with reference to their biological influence. The authors study the age of "playas"—levelled areas established in the land-locked hollows of the desert regions at their lower levels. The principal "playa" periods have occurred after universal glaciations and have coincided, not with recessions, but with the eustatical transgressions which follow the thawing of the snow. The terrestrial fauna and flora were affected by drought while the marine fauna did not suffer from it, but suffered from the recession during the glaciations. There thus exists a lag between the continental and the marine parts of the biosphere. *Subject Headings:* **1. Climatic changes 2. Paleoclimatology 3. "Playa"-age.**—*A. V.*

11.1–285 551.8:551.583.7

Butzer, K. W., **The Near East during the last glaciation: a palaeogeographical sketch.** *Geographical Journal*, London, 124(3):367–369, Sept. **1958.** fig., 5 refs. **DLC**—Palaeogeography not only deals with the reconstruction of the past configuration of oceans and continents, but also deals with the factors that help in the delineation of the landscape—the climate and soil, flora and fauna, land and water, vegetation and glaciation. A study of the above named factors as they effect man is given, with special reference to the near East. *Subject Headings:* **1. Paleogeography 2. Paleoclimatology 3. Near East.**—*N. N.*

MICROCLIMATOLOGY

See also: **Forest-hydrological investigations, Upper Harz** (Delfs et al.), 11.1–26; **Sweat damage to cargoes** (Cohen, Nelson), **11.1–130.**

11.1–286 551.584.33:551.482(477)

*Dubinskiĭ, G. P., **Mikroklimaticheskiĭ razrez doliny r. Dnepra v raĭone Kakhovki.** [Microclimatic cross section of the Dnieper Valley in the Kakhovka region.] *Kharkov. Universitet, Uchenye Zapiski*, 56:173–185, **1956.** 3 figs., 10 tables, 5 refs. **DLC** (AS262.K415)—A microclimatic network was set up in the valley of the Dnieper about 7 km from Novaia Kakhovka during July 1952. The 5 stations are described and shown on a sketch map. Observations were made regularly from 4 to 15 h and on 19–20, 22–23 and 26–27 July observations were also made every 2 hrs. Diurnal absolute and relative humidity, wind, temp., and saturation deficit, and the variations in these elements with winds from various quarters are analyzed and shown graphically for comparative purposes (with respect to various locations in the river valley.) Conclusion is that in summer the Dnieper exerts considerable influence on the microclimate of its immediate vicinity but the magnitude of this influence depends on local weather conditions, time of day and wind direction. The influence extends for 500–1000 m from the banks. During the day temp. is lower and humidity higher, and at night temp. is higher and wind speed greater than on the steppe. These influences are beneficial in summer for crops in a drought area and in spring and autumn for frost prevention. *Subject Headings:* **1. Microclimate of river valleys 2. River influences on local climate 3. Kakhovka region, Ukrainian S.S.R. 4. Dnieper Basin, U.S.S.R.**—*M. R.*

11.1–287 551.584.2

Genty, R., **Singularité climatologique des îles Crozet.** [Climatological peculiarities of the Crozet Islands.] *Académie des Sciences, Paris, Comptes Rendus*, 246(24):3366–3367, June 16, **1958. DLC**—From observations made by the recent French mission at the Crozet Islands (Nov. 1957), it seems that the climatological peculiarity of the Crozet Islands is caused by a conjunction of the warm air streams coming down from the Mozambique Channel and the cold air streams coming up from the South Pole. *Subject Headings:* **1. Local climates 2. Crozet Islands.**—*A. V.*

11.1–288 551.584.41:551.578.46

Anderson, H. W.; Rice, R. M. et al. (*all, U. S. Forest Service, Berkeley, Calif.*), **Forest shade related to snow accumulation.** *Western Snow Conference, April 1958, Proceedings,* 26:21–31, Oct. **1958.** 7 figs., 2 tables, 11 refs. **DWB** (M(06) W527p)—Report on the progress made in the measurement of forest effects on snow and the refinement of such measurements, in order to recognize still other effects. Methods adopted and the present results achieved on hemispherical cover, cover density effects and forest shade and shielding effects of forest lands are discussed and tabulated. The paper also deals with the methods of investigating forest and climatic effects as well as the variables and definition, the analyses, results and the accumulated application of the results of the investigation. *Subject Headings:* **1. Forest influences on snow accumulation II. West, A. J.**—*N.N.*

11.1–289 551.584.41(756)

†*Mark, A. F., (*Dept. of Botany, Duke Univ., Durham, N. Carolina*), **The ecology of the Southern Appalachian grass balds.** *Ecological Monographs,* Durham, N. C., 28(4):293–336, Oct. **1958.** 12 figs., 11 tables, bibliog., p. 334–336. **DLC**—A monograph reporting the result of a survey of the relation of the Southern Appalachian "balds" (or grassy plots on hilltops in forested mountain regions) to altitude, topography, aspect, major forest types, and a study of the vegetation, soils, microenvironments, seedlings and seeding, theories, etc. The general climate is discussed, with tabular data for Asheville, N. C. (2200 ft), on p. 295–8. Precipitation, snow, drought, temperature, wind and evapotranspiration being discussed separately here, and in much greater detail on p. 310–20 on the basis of 9 especially established micrometeorological stations on Round Bald in the Roan Mountain area and in adjacent forests and clearings from 5100 to 6280 ft (Oct. 29, 1956–Nov. 17, 1957). Equipment and sites are described and shown on charts. Soil temperature, fog, rime, frost action and soil moisture are also discussed. Conclusion is that the balds lie at margin between the upper limit of the hardwoods and the lower limit of coniferous forests. The latter were squeezed out by the Postglacial warming and cannot return easily to many places during the present "cooling" portion of the cycle, owing to lack of parent forests for seeding. The balds are further maintained by the severe weather conditions found in such "balds" and by destruction of seedlings by rodents, man and grazing animals. *Subject Headings:* **1. Forest micrometeorology 2. Micrometeorology of grass balds 3. Forest succession 4. Great Smoky Mountains, N. C.** —*M.R.*

CLIMATIC CLASSIFICATION

See also: **Agroclimat. regions, U.S.S.R.** (Selianinov), 11.1–121.

11.1–290 551.585:551.582(791,66)

*†Porter, William L.; Hogus, Donald W. et al. (*all, Environmental Research Branch*), **Analogs of Yuma climate in Northwest Africa (Yuma analogs, No. 3).** *U. S. Quartermaster Research and Engineering Center. Environmental Protection Research Div., Research Study Report,* RER-3, March **1955.** 25 p. 14 figs., 9 tables, 21 refs. **DWB**—The portions of Northwest Africa in which temperatures are analogous to those at Yuma in both winter and summer are limited to a strip on the interior side of the Atlas Mountains, and a second strip nearly surrounding the Ahaggar Mountains and adjoining the large area of composite analogy in Libya. Large parts of the study area are not analogous in either summer or winter, owing to the exclusion of the large western Sahara as too hot, and the mountainous regions of the Atlas ranges and the Ahaggar as too cool. Likewise, the entire Atlantic Coast south of the 32nd parallel of latitude is too cool to be analogous to either summer or winter. There remain substantial areas in which temperatures are analogous in summer or winter, but not both, although these are less extensive than in Northeast Africa. When areas of analogous mean annual precipitation, occurring as two transverse bands, are superimposed on the map of composite temperature analogy, zones of coincidence are found along the desert piedmont of the Atlas Mountains, including a large section west of the Gulf of Gabes, and farther south in the Air Highlands. The vast, nearly rainless interior of the Sahara is drier than Yuma everywhere except in a few elevated places. Rainfall is quite different from Yuma with respect to

seasonality, having a pronounced winter maximum in the north and summer maximum in the south in contrast to the occurrence of both summer and winter maximum at Yuma. Conditions of dew point and cloudiness comparable to those of Yuma in July are found in transverse bands in north west Africa, bordering the Sahara like those of analogous rainfall. The interior Sahara is less humid and even more sunny than Yuma. Winds in the interior desert are predominantly lighter than at Yuma, although sandstorms are more frequent. Of the elements studied, mean daily temperature range in the warmest month shows the largest area of values comparable to Yuma, covering much of northwest Africa exclusive of the immediate coasts. *Subject Headings:* **1. Climatic analogs 2. Climate of Yuma 3. Climate of Northwest Africa 4. Yuma, Ariz. 5. Northwest Africa. I. Robison, W. G.**—*Authors' abstract.*

11.1–291 551.585:551.582(791,584)

†*Robison, William C. and Dodd, Arthur V. (*both, Regional Environments Research Branch*), **Analogs of Yuma climate in Soviet Middle Asia (Yuma analogs, No. 5).** *U. S. Quartermaster Research and Engineering Center. Environmental Protection Research Div., Research Study Report,* RER-5, Sept. **1955** (reprinted May 1958). 18 p. 10 figs., 11 tables, 17 refs. **DWB**—All of Soviet Middle Asia is north of the latitude of Yuma, and most of it is, therefore, too cool for temperature analogy with Yuma. In the extreme south, however, two areas have summer temperatures high enough to be analogous. Winters are much colder than at Yuma. Mean annual precipitation is analogous (i.e., two to six in.) over a large area extending from the Caspian Sea to the foot of the Tien Shan. Approximately the same area is analogous or semi-analogous (less than 12 mph) at all stations for which data are available except Baku on the Caspian coast, where a mean of 14 mph is recorded. Summer dew points are analogous in the southwestern portion of the study area, including the Aral Sea and Caspian Sea regions. The greatest coincidence of analogy of combined climatic elements is in the extreme southern portion of the study area. Termez on the Afghanistan border is climatically most similar to Yuma; only the occurrence of lower winter temperatures at Termez prevents analogy of all climatic elements investigated. Areas of analogy of pertinent climatic elements are presented in a series of maps at the end of the report. *Subject Headings:* **1. Climatic analogs 2. Climate of Yuma, Ariz. 3. Climate of Central Asiatic U.S.S.R. 4. Yuma, Ariz. 5. Central Asiatic U.S.S.R.**—*Authors' abstract.*

11.1–292 551.585:631.4

†Schaufelberger, Paul (*Chindhinà, Columbia*), **Welches sind nach den Erfahrungen der Bodenkunde die massgebenden Klimafaktoren?** [What are the determining climatic factors as experienced in soil science?] *Petermanns Geographische Mitteilungen,* Gotha, 102(2):113–115, **1958.** 20 refs. eqs. **DLC**—Various systems of formulation of climatic factors are cited: E. N. Transeau (1905), A. Penck (1910), E. Ramann (1911), R. Lang (1915), E. de Martonne (1926), A. Meyer (1926), H. Jenny (1929), M. Gracanin (1950), P. Schaufelberger (1955, 1957) and others, and the author's own system set forth in outline form with discussion by various authorities. Season or zone, temperature, precipitation (effective), and altitude are factors included in the system, which is applied to soil classification, especially in tropical and mountain situations. *Subject Headings:* **1. Soil climate classification 2. Precipitation effectiveness 3. Climatic indexes.**—*M.R.*

BIOCLIMATOLOGY

See also: **Heating, ventilating and air conditioning,** 11.1–25; **Sultriness** (Hermann), 11.1–29; **Windbreak effectiveness in orchards** (Van Rhee), 11.1–119; **Air-borne diseases** (Wells), 11.1–133; **Artificial ionization effects on burns** (David et al.), 11.1–134; **Bioclimatic approach to polio prevention** (Irving), 11.1–135; **Pressure effects on man** (Dordick), 11.1–229; **Weather effects on skin permeability** (Häfelin, Lotmar), 11.1–302.

11.1–293 551.586:616.24

*Berg, Hellmut, **Ergebnisse zur Meteorotropie der fulminanten Lungenembolie und Kalender der fulminanten Lungenembolien in Westdeutschland, 1929 1940.** [Results

relating to the meteorotropy of fulminant pulmonary embolism and a calendar of fulminant pulmonary embolism in West Germany in 1929–1940.] *Cologne. Universität. Meteorologisches Institut, [Publication]*, No. 1, **1953.** 50 p. numerous tables, ref.—Pulmonary embolism in Germany 1929–1940 was statistically analyzed and checked against cold and warm fronts and other meteorological aspects for possible relationship. More than 100,000 x-rays were scrutinized of which 4241 were selected as representing valid fulminant pulmonary embolism. These cases are listed day-by-day, under the months of the years 1929–1940 and indexed for distribution according to 18 German districts. Observed and calculated frequencies are identical. Monthly mean values were a minimum of 324 in February, a maximum of 392 in December; by hour the minimum was 87 at 24.00 and maximum 189 at 07.00. By district: the minimum was 307 in Neckarland, maximum 731 in Hamburg. Fulminant embolism vs. cold fronts: total 667, minimum 47, maximum 122; and vs. warm fronts: total 191, minimum 7, maximum 39. Fulminant embolism vs. fronts district wise: cold fronts: minimum 47 in Neckarland, maximum 122 in Hamburg, and by warm fronts: minimum 7 in Neckarland, maximum 35 in Hamburg. *Subject Headings:* **1. Weather effects on fulminant pulmonary embolism 2. West Germany.**—*W.N.*

11.1–294 551.586(26)

d'Avanzo, G., **Report of the Committee of Nautical Bioclimatology.** *International Journal of Bioclimatology and Biometeorology*, Leiden, Vol. 1 (Pt. 4, Human Bioclimatology), **1957.** 2 p. **DWB**—The Committee of Nautical Bioclimatology appointed as chairman D. Molfins, Director of the Institute of Occupational Medicine of the University of Genoa. The Committee uses the Bulletin "Laxozo e Medicine" issued by this Institute for its reports. The scopes of nautical bioclimatology and nautical medicine are differentiated. The possible fields of research of nautical bioclimatology and the program of the Committee of Nautical Bioclimatology are outlined. *Subject Headings:* **1. Nautical bioclimatology 2. Committee of Nautical Bioclimatology.**—*I.L.D.*

11.1–295 551.586:061.3

Pieślak, Z., **I Kongres Bioklimatologiczny w Wiedniu.** [First Bioclimatological Conference in Vienna.] *Przegląd Geofizyczny*, Warsaw, 3(1):60–62, **1958. DWB, DLC**—The conference, which was the first since the organization of the International Society of Bioclimatology and Biometeorology in Paris (France) in December 1950, took place in Vienna Sept. 23–27, 1957. It was attended by 120 representatives from many countries (including 5 Poles) and a delegation of the World Meteorological Organization. Actual deliberations were preceeded by reports of committee chairmen (including the committees on allergic diseases, climatographic ecology, atmospheric ionization, scientific bioclimatology, etc.) on work performed since the organization of the Society. Because of the large number of reports and the time limit imposed, many of them were presented in summaries or were not delivered. The reports varied greatly both in regard to topics and to scientific level; many will be reviewed in later issues of this journal. *Subject Headings:* **1. Bioclimatic conferences 2. Vienna, Austria.**—*A.M.P.*

11.1–296 551.586:551.521.11:612.5

Wagner, Heinrich, **Sonnenschein und Körpertemperatur: Änderungen in der jahreszeitlichen Reaktionsweise bei Kurpatienten.** [Sunshine and body temperature: changes in the seasonal reaction of resort patients.] *Naturwissenschaften*, Berlin, 45(6):143–144, March 15, **1958.** 3 figs., 3 refs. **DLC**—In 30 rheumatic patients at Bad Elster the oral temperature was taken every morning under basal conditions and the mean of the group was computed daily. In order to eliminate weekly cycles the daily means were smoothed by the use of pentad means. The annual curves for each year of the period 1952–1956 are presented. The annual curves of body temperature showed considerable minor seasonal variations, which are related apparently to the large scale weather situations. A comparison was made with the annual variation of five day means of sunshine duration measured at Bad Elster. It was found that in the spring during periods with much sunlight, the body temperature is always lower than under the opposite condition; in summer the body temperature rises with increasing sunshine duration. Correlation coefficients (r) = 0.82 for 1953 between six smoothed pentad values

of body temperature and sunshine were significant at the 5% level with 4 degrees of freedom. The annual variation of the correlation coefficient shows a preponderance of negative values in spring and fall and hence a striving for the sun. In the summer the strong sunshine is avoided. The first peaks in March were the result of the first periods with plentiful sunshine which are compensated immediately by a counter reaction during the sensitive past winter reaction threshold. Similar behavior of r was found to prevail for other years. This study confirms DE RUDDER's concept of biological seasons, and the significance of sunshine in the formation of annual rhythms in mammals is discussed briefly. *Subject Headings:* **1. Sunshine effects on body temperature 2. Body temperature.**—*I.L.D.*

11.1–297 551.586:551.521.16:551.524:591.54:595.76

Chopard, L., **Les migrations du hanneton.** [Migration of the cockchafer.] *La Nature*, Paris, No. 3288:164–167, April **1959.** 12 figs. **DLC**—Study on the migration of the cockchafer and analysis of the influence of medium and climatic conditions. Cockchafers cover distances sometimes reaching 20 km, at an altitude varying from 6 to 100 m. Two types of migration must be distinguished: pre-feeding migrations on the one hand, laying and after-laying migrations on the other. After the winter season, cockchafers come to the soil surface only when its temperature rises above 10°C. After a short return to the soil, with a few days with temperatures from 18 to 20°C, they perform their first flights. These are influenced by the degree of illumination: they cease as soon as a cloud conceals the sun. Activity is null in the afternoon, high at evening and stops suddenly before night. A fall in temperature stops the flights for laying; they continue when temperature rises above 10°. Studying migration of the cockchafer makes it possible to limit the areas where they lay their eggs and facilitates the treatment of soils with insecticides. *Subject Headings:* **1. Cockchafer migration 2. Ecology 3. Climatic influences.**—*A.V.*

UPPER AIR CLIMATOLOGY

See also: **Aerology, Maudheim** (Schumacher), **11.1–21.**

11.1–298 551.587:551.510.534

†Wexler, Harry (*U. S. Weather Bureau, Wash., D. C.*), **A meteorologist looks at the upper atmosphere.** (In: American Academy of Arts and Sciences, **Atmospheric explorations.** Cambridge, M. I. T., **1958.** p. 79–100. 12 figs., 2 tables, 31 refs.) **DLC** (QC961.A4)—BENJAMIN FRANKLIN's meteorological investigations alone (for 60 years from 1726–1786) would have entitled him to the highest rank, for besides research on atmospheric electricity he kept weather diaries; studied and observed vortexes, hurricane or cyclone movement, fog formation, gulf stream waterspouts, auroras; and made long range forecasts based on widespread volcanic dust in the atmosphere (1783). His most famous deduction regarding the progressive movement of a northeast storm from Philadelphia to Boston (1743) and later observations on the horizontal movement of storms, while Postmaster General (1753–1775), is still the basis for most synoptic forecasts. Nothing certain is as yet known of vertical propagation of cyclones (either up or down). Empirical studies of downward propagation of atmospheric disturbances from the outer atmosphere or ionosphere are reviewed and the "Berlin warming" of Feb. 21–23, 1952 and its possible causes and effects are studied in great detail and illustrated. SID's, ozone winds and temperatures in the Arctic stratosphere are then analyzed and computations of downward and of upward propagation of disturbances discussed. In connection with the "Berlin warming," 3 large folded 50 mb contour charts are presented for the Northern Hemisphere for Feb. 1, 15 and 29, 1952 and evidence given to support the author's explanation in terms of subsidence in the 15–50 mb region over western or central Canada (as confirmed by ozone enrichment at Edmonton in mid-February) as an anticyclone moved in, and later advection to Central Europe to replace a very cold cyclone. The WILLETT theory of corpuscular energy does not allow for the fact that the corpuscular beam from the giant eruptions on Feb. 22 at 1400 h did not reach the earth until 31 hrs later, or *after the warming occurred.* On the other hand the SCHERHAG explanation, in terms of UV penetration in a region of low O_2 values at normal levels to produce abnormal warming at the 15 mb level, would require a heating rate of $\frac{1}{2}$ to $1\frac{1}{2}$ solar constants, which is beyond known extreme values even during

solar outbursts. Advection of contrasting temperatures from a deep cyclone to a warm subsidence ridge could easily account for the marked warming shown by a plotting of daily soundings on Feb. 21–March 7, 1952 at Berlin. At 50 mb the warming is not as marked as at 25 mb (as shown by a time-curve in correlation with solar flares, SID's, chromospheric eruptions and magnetic storms). P. M. SAUNDERS (*see* Weather, 14(1):34, Jan. **1959**) in his review emphasizes the interesting citation concerning FRANKLIN's meteorological contributions but does not seem to have read the rest of the paper. *Subject Headings:* **1. Franklin's meteorological investigations 2. Stratospheric warming, Feb. 1952 3. Ozone concentrations during Berlin warming.**—*M.R.*

11.1–299 551.587(02)

Reshenie Pervogo Vsesoiuznogo soveshchaniia po voprosam aeroklimatologii. [Resolutions of the First All-Union Conference on Aeroclimatological Problems.] *Tashkent. Geofizicheskaia Observatoriia, Trudy,* No. 11/12:144–150, **1956. DLC**—The resolutions of the Conference dealt mainly with measures to be taken in order to complete the compilations of the Aeroclimatological Handbook at the earliest possible date (it was to have been ready for printing by the end of 1956) arranged by 12 regions, and approved methods for summarizing the results of upper air observations concerning temperature, air pressure and density, wind, as well as the proposed tabulation samples for the Handbook. *Subject Headings:* **1. Aeroclimatological handbooks 2. Upper air observation techniques.**—*A.M.P.*

ENVIRONMENTAL INFLUENCES

See also: **Forest-hydrological investigations, Upper Harz** (Delfs), 11.1–26; **Pressure gradient at edge of ice sheet** (Hamilton), 11.1–49; **Forest met. conf.** (Pećzely), 11.1–65; **Forest radiation interception** (Baumgartner), 11.1–122; **Forest met., Hungary** (Botvay), 11.1–125; **Forest effects on snow melt** (Rakhmanov), 11.1–126; **Rainfall variations with height** (Michel), 11.1–261.

11.1–300 551.588:634.9

*†Paterson, Sten Sture, **The forest area of the world and its potential productivity.** *Göteborg. Universitet. Geografiska Institut, Meddelande,* No. 51, **1956.** 216 p. 36 figs., 30 tables, bibliog. p. 201–211. Map (fold. in color, in pocket), scale 1:30,000,000. Thesis (Ph.D.)-Univ. of Göteborg. Price: Kr. 58. **DLC** (SD131.P3)—An excellently printed monograph devoted to the quantitative study of forested lands of the world and their potential, assuming proper forestry practices, and based on climatic considerations and actual forest productivity statistics published by F.A.O. in the **Empire Forestry Handbook** (Oxford, **1946**), **Forest Resources of the World** (Washington, **1948**) and elsewhere in official documents, etc. and using a cartographic approach. In all, 129 areas (countries or provinces) are recognized, for which detailed data are given. Temperature and precipitation (moisture) requirements and limitations are discussed for various climatic types under various systems of classification (or indexes). Climate is said to be related to or reflected in most of the other factors considered vital to forest productivity (i.e. soil, light, topography, biological activity and ecology), and the climatic factors indicated are: 1) moisture (precipitation and evaporation); 2) temperature and 3) wind. Chemical denudation of soil in rainy regions is also important. Meteorological data for 1426 stations all over the world are used to compute the CVP index with indication of precipitation, growing season, percentage of sunshine, mean temperature of warmest month and range (CVP index and its relation to ideal growth site is shown on scattergram and a formula extracted from the curve). CVP = climate-vegetation-productivity, and the index is based on the formula $I = \frac{Tv \cdot P.\ G.\ E.}{Ta \cdot 12 \cdot 100}$, where Tv = temperature range; Ta = temperature of warmest month; P = precipitation; G = length of growing season; E is an evapotranspiration reducer. Climato-isophytes based on CVP index are presented on maps of each continent. Finally, potential production in millions of cbm of roundwood is tabulated for each country, together with area and total value of possible production and data shown on maps. The large, substantial wall map (fold.) of the world shows areas of "accessible," "inaccessible" and "other" forests by squares or rectangles indicating 1,000,000 ha, 500,000 ha, 250,000 ha and 125,000 ha

of forest, respectively. Total potential productivity for the world is given as 19 billion cbm or 13 times present production. Economic considerations are discussed at some length. By about the year 2020 world production of forest products must double to be above 3 billion cbm since population, and hence consumption, will have doubled by that time. But if industrialization increases in areas such as India and China, production must more than double (e.g., if literacy increases the amount of reading matter (pulp) will increase accordingly). Areas of production surplus and production deficit are shown on world chart. Production deficit occurs in both low and high population density areas for opposite reasons (high and low literacy). *Subject Headings:* **1. Forest productivity 2. CVP-Index for world 3. Climatic effects on forest productivity.**—*M.R.*

11.1–301 551.588.3:631.4

†Schuylenborgh, J. V., **On the genesis and classification of soils, derived from andesitic tuffs under humid tropical conditions.** *Netherlands Journal of Agricultural Science*, Wageningen, 6(2):99–111, May **1958.** 6 tables, 31 refs. **DLC**—Morphological and chemical descriptions are provided of soils derived from andesitic tuffs under conditions of high rainfall and perfect drainage, but at various altitudes. The soils can be grouped in five belts. For these soil groups the following names are proposed: Belt 1, extending from 1600 m to 1300 m altitude: Humid Grey-Brown Podsolic soils; Belt 2, from 1300 m to 1000 m altitude: Tropical Grey-Brown Podsolic soils; Belt 3, from 1000 m to 600 m altitude: Acid Brown Forest soils (according to a suggestion of VEENENBOS); Belt 4, from 600 m to 300 m altitude: Podsolized Brown Latosols (DAMES, 1955); Belt 5, from 300 m to sea level: Latosolic soils (THORP and SMITH, 1949). The physical and chemical differences are discussed on the basis of the rate and mode of destruction of the organic matter, on the diffusion of carbon dioxide developed, and on the nature of the clay formed. *Subject Headings:* **1. Soil classification 2. Climatic effects on soil 3. Tropics.**—*Author's abstract.*

DYNAMIC AND SYNOPTIC CLIMATOLOGY

See also: **Dynamic climat.** (Stelmaszczyk), 11.1-46; **Radar analysis of ceiling-visibility variations** (Austin, Glass), 11.1–145; **Upper air data summaries, W. Africa,** 11.1–183.

11.1–302 551.589.1:591.14 551.586:612

Häfelin, J. and Lotmar, R., **Über den Einfluss der Witterung auf die Hautpermeabilität (Versuche mit Kaninchen).** [Influence of weather on skin permeability (tests on rabbits).] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 136:95–96, **1956.** 2 tables. **DWB, DLC**—A summary of a study on the effect of weather upon the skin permeability of rabbits involving 237 permeability tests. The results of the tests in the relationship between skin permeability and frontal passages and of the statistical test based on VON SCHELLING's "four-field table" are presented. A definite relationship is established with a greater than chance probability of 99.73% when $T>3$. Increased skin permeability on warm front days as against slight skin permeability on front free days, $T=3.2$; increased skin permeability on days with occlusions as against slight permeability on front free days, $T=6.3$, etc. (A detailed report on this study appeared in *Archiv für Geophysik und Bioklimatologie, Ser. B.*, 7(2):286–296, **1956**; *see* 7.9–246, Sept. 1956, *MAB.*) *Subject Headings:* **1. Air mass effects 2. Skin permeability 3. Rabbits.**—*I.L.D.*

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Solar-terrestrial relationships** (Chapman), 11.1–75.

11.1–303 551.590.21:537.531

†Vegard, L. (*Univ. of Oslo, Oslo, Norway*), **Solar and terrestrial phenomena resulting from photoelectric effect of solar x-rays.** (In: **The Threshold of space,** ed. by M. Zelikoff. N. Y.,

Pergamon Press, **1957.** p. 22–31. 26 refs., 4 eqs.) **DLC**—Discusses the nature of solar electric ray bundles, terrestrial aurora and its consequences, the X-ray theory and the structure of the auroral region (ionosphere), including conductive layers produced by X-rays, and the explanation of zodiacal light by the X-ray theory, the universal character of this theory covering the ionosphere, the theory of the solar corona and of solar ray bundles producing auroral and magnetic disturbances, electron-proton bundles, the influence of the charge of relative proton flux on the composition of the auroral luminescence, including its variations with latitude, the behavior and effects of the neutralized bundle of its way through the atmosphere and ionospheric processes produced by the neutralized solar bundles. *Subject Headings:* **1. Solar-terrestrial relationships 2. Solar X-rays 3. Auroras.**—*A.A.*

11.1–304 538.3:532.51:523.5 551.590.25

Brysk, H. (*Radiation Lab., Michigan Univ.*), **Electromagnetic scattering by low-density meteor trails.** *Journal of Geophysical Research,* Wash., D. C., 63(4, Pt. 1):693–716, Dec. **1958.** 3 figs., 2 tables, 16 refs., 105 eqs. **DWB, DLC**—Expressions for the scattering of electromagnetic radiation by a meteor trail have been derived for a simple model. A uniform line density of electrons is first considered, of sufficiently low density that the interaction between electrons can be neglected. Then, the model is extended to include the effect of ambipolar diffusion. Finally, the fast initial penetration of the particles before they are slowed down to thermal velocities is taken into account. Similar model assumptions have previously appeared in the literature, except that an effort has been made here to retain consistently the intrinsic three-dimensional geometry of the problem. The derivations are based on an idealized superposition of antenna patterns with a constant gain within the coverage and a sharp cut-off; the extension to an arbitrary pattern is simple, and the procedure is sketched. Various limiting cases are considered, with careful specification of the realm of validity of approximations. The familiar expressions emerge in the large wave length limit for specular scattering. Nonspecular scattering and intermediate orientations are also treated. A small wave length limit is derived, and the transition wave lengths are explored in detail. *Subject Heading:* **1. Electromagnetic wave scattering by meteors.**—*Author's abstract.*

VISIBILITY

See: **Visibility of artificial satellites** (Gulledge et al.), **11.1–108**; **Visibility data, Shannon Airport** (Dixon), **11.1–115.**

OPTICAL PHENOMENA

See also: **Rainbow theories** (Boyer), **11.1–73**; **Rainbow theories** (Crombie), **11.1–74**; **Absorption** (Haubert), **11.1–219.**

11.1–305 551.593.652(712.3)

Zamolsky, N., **Nacreous cloud.** *Weather,* London, 13(2):71, Feb. **1958. DWB**—May 25, 1957 at 2000 h MST, an iridescent lenticular cloud was observed at Calgary (51°N, 114°W) Airport at an angle of 290°. Colors were bright rose, pale green, yellow and pearl white (only 4 colors visible). An extensive ridge of high pressure extended from Canadian Arctic to West Saskatchewan on the surface chart and a ridge over Alberta at 700, 500 and 300 mb. Upper winds were WSW to W at 700–300 mb. *Subject Headings:* **1. Nacreous clouds 2. Calgary, Alberta.**—*M.R.*

11.1–306 551.593.653(573)

Martynenko, V. V. and Gapotchenko, A. G., **Nabliudeniia serebristykh oblakov 29 iiunia 1957 g.** [Observations of noctilucent clouds, June 29, 1957.] *Astronomicheskiĭ Tsirkuliar,* Kazan, No. 187:25, Dec. **1957. DLC**—Unusual milk-white, light-blue clouds resembling noctilucent clouds were observed by the authors at 3:20 a.m. on 29 June 1957 at Pereval'nyĭ (34°19′3N, 44°50′5E) inside the crepuscular segment; after losing their brightness and becoming pale pink and transparent they disappeared at 3:50 a.m. The authors are not sure

that they were actual noctilucent clouds because light cloud formation of the cirrus type were seen at the same time outside of the crepuscular segment. *Subject Headings:* **1. Noctilucent clouds 2. Pereval'nyĭ, Sakhalin Island.**—*A.M.P.*

11.1–307 551.593.7:551.521.326(688)

Hoffmeister, C., **Hinweise auf atmosphärische Wirkungen interplanetarer Materie (Ergebnisse der Beobachtungen in Südwestafrika 1952–1953: Fünfte Mitteilung.)** [Indications of atmospheric effects of interplanetary matter: 5th report on results of observations in South-West Africa, 1952–1953.] *Astronomische Nachrichten*, Berlin, 283(1):13–16, April **1956.** 2 figs., 4 tables, 16 refs. **DLC**—Measurements of the color and polarization of airglow during clear atmosphere in South-West Africa indicate stronger turbidity before noon. Atmospheric polarization measurements at Arago's neutral point during morning and evening twilight confirm this effect and suggest the cause is to be found in high layers. Also the angular distances of Arago's point at solar zenith angles over 95° correspond to a higher degree of turbidity in 1937 than in 1952. Correlations between these phenomena and supply of meteoritic matter and the occurrence of high atmospheric luminescence are discussed. *Subject Headings:* **1. Airglow polarization 2. Arago's point 3. Airglow spectroscopy 4. South-West Africa.**—*Author's abstract.*

11.1–308 551.593.7:551.593.62 535.34

*Shifrin, K. S. and Rabinovich, Iu. I., **Spekral'nye indikatrisy krupnykh kapel' vody i spektral'naia poliarizatsiia radug.** [Spectral indices of large water drops and the spectral polarization of rainbows.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 12:1491–1506, **1957.** 4 figs., 7 tables, 2 refs. **DLC.** Article available in the Engliah language ed. of **Izvestiia,** *Bulletin of the Academy of Sciences of the USSR, Geophysics Series* issued by the American Geophysical Union.—The spectral indices of scattering of large water drops in that part of the spectrum where absorption of light on large water drops can be regulated (the near ultraviolet, the visible and near infra-red parts) and the spectral polarization of the various color arcs in rainbows, are computed by means of formulas of geometrical optics and the variation of $M(\lambda)$ for liquid water. Tables are presented giving the coefficients of refraction for different parts of the spectrum, angle of incidence $\varphi^{(k)}$ (leading in the kth order to a rainbow) for different values of k and n, $\beta^{(k)}$ determining the position of different spectral rainbow in space, values of $\tau_s^{(k)}$ for $k=1, 2 \ldots 5$ and $\tau_p^{(k)}$ and the values τ_s, τ_p and τ for all values of n and also the degree of polarization for all chosen angles β. Also the exactness with which it is possible to neglect within a given spectral interval the dependence of n upon τ i.e., to consider the droplet on a black body, is analyzed and a table giving values of Δ (the variation of the intensity of scattering according to the relationship to $n=1.3200$) is included. These calculations can be applied to all large sphreic particles (not only water) in which the relative coefficient of refraction lies in the interval from 1.3200 to 1.3450. *Subject Headings:* **1. Spectral reflectivity 2. Rainbow polarization.**—*I.L.D.*

11.1–309 551.593.7 551.593.5:535.4

Tanaka, T.; Tomita, A. et al. (*all, Physical Society of Japan, Tokyo Univ.*), **On the polarization of the light scattered in the lower atmosphere.** *Geophysical Magazine*, Tokyo, 28(4):539–561, Sept. **1958.** 34 figs., tables, 7 refs., eqs. **DWB, DLC**—The light scattered by the open air in the direction of a remote mountain is partially polarized. In the regions where the atmospheric air is quite dustless or fairly windless, the formula $P=\frac{a\sin^2\varphi}{2-a\sin^2\varphi}$ holds good fairly well. Some deviations can be explained as owing to the influence of the light scattered from the mountain itself. Otherwise the polarizability is modified, which is probably explained as due to the mixing of dust particles. The sizes of the particles which are the smallest possible seem to be quite uniform in the course of several hours. The sizes of the particles have also been investigated. They are found somewhat larger than those found in the blue sky in 1954. Moreover, in a region where the atmospheric air is quite dustless, the polarizability constant "a" seems to increase with the humidity. An explanation is given for it. *Subject Headings:* **1. Polarization 2. Scattering of light. I. Sato, T.**—*Authors' abstract.*

ELECTRICAL PHENOMENA

See also: **Lightning-caused forest fires** (Bennett), 11.1–124; **Thunder during cloud seeding** (Uchida), 11.1–179.

11.1–310 551.594.1/2(26)

Programma izmereniĭ elementov atmosfernogo elektrichestva na okeanakh. [Program of atmospheric electricity measurements over oceans.] *U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby. Komitet po Provedeniiu Mezhdunarodnogo Geofizicheskogo Goda, Informatsionnyĭ Sbornik,* No. 4:100, **1957. DWB**—The purpose of this program is the determination of the general variation of electric field intensity of the atmosphere and conductivity currents for the entire earth; verification of the correlation between unitary variations of electric field intensity of the atmosphere and the variation of world thunderstorm activity; and the characteristics of the electric fields of thunderstorms over oceans. Measurements of field intensity are to be made on the "Ob" and "Lomonosov." The electric field intensity and conductivity of the atmosphere is to be measured, including currents from points (St. Elmo's fire). The electric field intensity will be measured by means of a flux meter. *Subject Headings:* **1. Atmospheric electricity measurements 2. Electric field intensities 3. Thunderstorm electricity over oceans.**—*I.L.D.*

11.1–311 551.594.1:551.508.94

Programma izmereniĭ napriazhennosti elektrostaticheskogo polia v svobodnoĭ atmosfere. [Program for measuring the electrostatic field strength in the free atmosphere.] *U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby. Komitet po Provedeniiu Mezhdunarodnogo Geofizicheskogo Goda, Informatsionnyĭ Sbornik,* No. 4:99, **1957. DWB**—The investigations includes the following: determination of the variation of the electric field intensity with altitude; determination of the effect of cloudiness in different geographic conditions upon distribution of electric field intensities with height and on the distribution of total charges; determination of the potential and height of the layer where the electric field becomes zero and its variations with time and various locations on the earth's surface; verification of the hypothesis of the spheric condensor formed by the earth and by high altitude conducting layers of the atmosphere. The measurements are to be made with the aid of airplane condensors and airplane soundings at fixed intervals in clear and cloudy days. *Subject Headings:* **1. Atmospheric electricity variations 2. Electric field meters.**—*I.L.D.*

11.1–312 551.594.11:523.7

Gherzi, Ernest, **Preliminary note on the registration of the electric potential of the air at Brebeuf College.** *Bulletin de Géophysique,* Montreal, No. 2:31–39, Sept. **1957.** 2 figs., refs. Also his: **Note on the electrical potential of the air at Brebeuf College.** *Ibid.,* No. 3:25–28, June **1958.** table. **DWB**—Details are given on the most discernible results of the first six months of recording of atmospheric electrical potential gradient at Jean Brebeuf College. Three maxima are found, at 13, 18 and 2 hr G.M.T. They are compared with those obtained by other observatories. The discrepancy found in the case of the 18 h maximum (13 h local time) is explained by the geographic location of the station. A recurrence of certain groups of oscillation is also observed, but their correlation with microbarographic records does not appear to be significant. An ionospheric influence should possibly be considered. In the second article "the author gives some results of observations made from June 1957 to April 1958 by means of recordings of atmospheric electric potential obtained at Brebeuf College in Montreal." *Subject Headings:* **1. Potential gradient variations 2. Montreal, Canada.**—*Transl. of author's abstracts.*

11.1–313 551.594.11(573)

*Zykova, V. V., **Gradient elektricheskogo potentsiala atmosfery v g. Iuzhnosakhalinske za 1933–1946 gg.** [Electrical potential gradient of the atmosphere in Yuzhno-Sakhalinsk in 1933–1946.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* 58(120):78–80, **1956.** 4 tables, 6 figs. **DLC**—Data are presented on the mean daily variation of the electrical potential gradient for the period 1933–1946, and annual and secular variation of the electrical potential gradient in Yuzhno-Sakhalinsk. *Subject Headings:* **1. Potential gradient variations 2. Yuzhno-Sakhalinsk, Asiatic U.S.S.R.**—*I.L.D.*

AURORAS

See also: **IGY aurora program, 11.1–39; Auroral research** (Chapman), **11.1–75.**

11.1–314 551.594.5

Winckler, J. R.; Peterson, L. et al. (*all, School of Physics, Univ. of Minnesota*), **Auroral storm of Feb. 10–11, 1958.** *American Geophysical Union, Transactions*, 39(6):1225–1230, Dec. **1958.** 3 figs. **DWB, DLC**—During the night of Feb. 10–11, 1958, a very large auroral storm occurred. The storm and other related phenomena were especially well observed and reported, both visually and by a number of instrumental techniques. Balloon-borne instruments at Minneapolis detected two groups of strong X-ray bursts during the storm. These coincided with two large magnetic bays (increases or decreases in the intensity of magnetic-field components, represented by bay-like indentations on graphs showing variations of magnetic intensity with time); with strong absorption of radio noise; and with the passage across the zenith of a very large amount of auroral luminosity. A cosmic ray decrease also accompanied the storm. The University of Minnesota workers believe that these terrestrial disturbances were associated with the earth's entry into a large cloud of solar gases that may have originated in a solar flare occurring about a day earlier. *Subject Headings:* **1. Auroral storms. I. Hoffman, R. II. Arnoldy, R.**—*Authors' abstract.*

11.1–315 551.594.51:621.396.1

†Collins, C. and Forsyth, P. A. (*both, Defence Research Board, Ottawa, Canada*), **A bistatic radio investigation of auroral ionization.** *Journal of Atmospheric and Terrestrial Physics*, London, 13(3/4):315–345, Feb. **1959.** 13 figs., 2 tables, 32 refs. **DLC**—The scattering of radio waves in the upper atmosphere during auroral disturbances has been studied by means of a number of radio systems in which each transmitter was separated from its associated receiver by a distance of about 1000 km. Some twenty of these systems were used in a network covering a large area in Canada. The frequencies were in the range 30–50 Mc/s. At least four different kinds of auroral events are distinguishable. Of these, two appear to be associated separately with different phases of visible aurora, the third with a later stage in the auroral process which is not observed visually, and a fourth with the recurrent daytime absorption which often precedes an auroral disturbance. The term "radio-aurora," which applies to all of the events, is used to avoid confusion with that part of the auroral process which is observable visually. In these four events, evidence is found for three separate scattering mechanisms, each of which has been proposed previously as the principal source of radar echoes from aurora. *Subject Headings:* **1. Auroral ionization 2. Radio echoes from auroras.**—*Authors' abstract.* Ⓢ.

11.1–316 551.594.51:546.11

Isaev, S. I., **O vodorodnom izluchenii v spektre poliarnykh siianiĭ.** [Hydrogen radiation in auroral spectra.] (In: Akademiia Nauk SSSR. Komissiia po Issledovaniiu Solntsa, **Fizika solnechnykh korpuskuliarnykh potokov i ikh vozdeĭstvie no verkhniuiu atmosferu zemli.** Moscow, **1957.** p. 178–179. 4 figs.) **DLC** (QB531.A5)—During January, February, March and October, 1955, A. E. Veller obtained more than 20 spectra of the aurora at Murmansk (F:1.2, Dispersion 330 Å/mm). Preliminary analysis of these spectrograms showed that Hα lines were shifted or not shifted toward the violet by a Doppler effect depending on the orientation of the apparatus relative to the earth's magnetic field. Four series of spectrograms are reproduced, showing this Hα line at 6563 Å, but at times this line is masked by a strong N_2 line at the same frequency. The spectra were recorded during intense magnetic storms on Feb. 18–19, 1955, March 10–11, 1955 and March 22, 1955, and during a weak magnetic storm on Oct. 22–23, 1955. Weak N_2 spectra or shifting evidently makes the Hα lines visible. Results are tied in with those of Meinel and Gartlein, and of K. L. Bowles (1954). *Subject Headings:* **1. Auroral hydrogen lines 2. Murmansk, U.S.S.R.**—*M.R.*

11.1–317 551.594.52:550.38

Abbott, W. N. (*Univ. Athens*) and Chapman, S. (*Geophys. Inst., College, Alaska*), **On the aurora of August 19, 1950, photographed from Greece.** *Journal of Atmospheric and Terrestrial Physics*, London, 14(1/2):111–122, April **1959.** 5 figs., table, 11 refs. **DLC**—Further details

are given concerning an auroral photograph already reproduced and discussed (*see* 3.5–286, May 1952, *MAB*). The association between the occurrence of auroras in low latitudes and the 3 hr geomagnetic disturbance index K_p is considered. The aurora was reported from places over a wide area (Europe, the Atlantic and North America); its reported appearances ranged from 18 Aug. at 2130 h to 19 Aug., 0530 h UT (at Nantucket); and from New England it was seen after sunset, from about 0730 UT on 19 Aug. *Subject Headings:* **1. Auroral photographs 2. Auroral-geomagnetic relationships 3. Aurora of Aug. 19, 1950 4. Greece.**—*Authors' abstract.* Ⓢ.

11.1–318 551.594.52

Veller, A. E. (*Inst. of Terrestrial Magnetism, Murmansk Dept., U.S.S.R.*), **Hydrogen emission at the final stage of the aurora.** *Annales de Géophysique*, Paris, 14(3):323–325, July/Sept. **1958.** fig., 8 refs. **DLC**—Observations of Hα auroral emission were carried out with a grating spectrograph F : 1, 2 (335 Å/mm) close to the auroral zone. Systematic presence of the hydrogen emission was marked in spectra of weak forms at the final stage of the aurora. It can be supposed naturally that the intensity of the high-latitude hydrogen emission decreases from the early forms to later ones less rapidly than it does in the lower latitudes. *Subject Headings:* **1. Auroral emission 2. Hydrogen emission 3. Afterglow.**—*A. V.*

PART II. BIBLIOGRAPHY OF OUTSTANDING REFERENCE WORKS OF THE PAST DECADE

Compiled by: Malcolm Rigby

INTRODUCTION

This bibliography and the one which will be published in the February issue of *Meteorological Abstracts* represent an attempt to review the major sources of organized reference material for university or advanced research laboratories. The biggest storehouse of original reference material is, of course, to be found in the primary journals of every country, and in the hundreds of monographs, reports and miscellaneous publications issued by meteorological services and institutions of all kinds.

Of these 60,000 or more articles and publications issued since World War II, at least 5000 would, because of form or content, be of lasting reference value, and of the 5000, about 500 are in the form of compendiums, handbooks, manuals, textbooks, technical monographs, atlases, etc. which would be necessary or suitable for a reference library. About 250, which could be considered of outstanding or permanent value as tools for advanced work, have been selected for this compilation. The remaining 250, which would be valuable for elementary or popular reference, will be reviewed later.

Because of limited space, it was necessary to divide the selection into two groups: 1) works which are primarily of *reference* value, although possibly of use in teaching, and 2) works which are intended primarily for *teaching*, but are still of value for reference purposes. The latter group is reserved for the next issue.

It is not hard to select the 10, or even the 25, most valuable reference works for a general meteorological library. Our own experience over the past decade has shown us, empirically, which works are indispensible—in other words, those which one uses every day and must have within arm's reach. The next 100 are harder to choose, for here one gets into the specialized and borderline fields such as oceanography, hydrology, geomagnetism, statistics, astrophysics, etc.; into special forms such as atlases, tables, glossaries, instruction manuals, collections of articles, memorial volumes, etc.; and into the less productive languages or countries, making it difficult to apply the same standards of quality that would be used if the works were in a homogeneous field, form or language.

As can be seen from the material which follows, no hard and fast rules have been applied. A few works issued before 1950 have been included: e.g., Berry, Bollay and Beers, **Handbook of Meteorology,** issued in 1945 (11A–32) or Scherhag's **Wetteranalyse und Wetterprognose,** published in 1948 (11A–17). No attempt has been made to include a number of nonserial works which have already appeared in 1960, although citations have been made to the last in several series of atlases or bibliographies with a 1960 imprint (11A–92 and 11A–103). The distribution of dates of imprint of the 100 odd works is as follows:

1945—1	1951— 9	1956—17
1947—1	1952— 6	1957—14
1948—1	1953—12	1958—10
1949—1	1954—12	1959—10
1950—5	1955—18	1960— 2

Several of the works presented in this bibliography have not yet been mentioned in the Current Abstracts section of *Meteorological Abstracts and Bibliography.* These are: **Ocherki razvitiia meteorologii** [Notes on the History of Meteorology], by Khrgian (11A–57); **Climatological and Oceanographic Atlas** by the U. S. Weather Bureau and U. S. Hydrographic Office (11A–93). Vol. 4 of the **U. S. Navy Marine Climatic Atlas** (11A–92), and Vol. 8 of the **Arctic Bibliography** (11A–102) have also appeared since the last references to these series were published in *MAB.*

The following outline gives a perspective of the distribution and identity of the works included in this collection, according to form of work, subject, and geographic place. The original titles have not always been used; rather a shortened or translated title has been substituted where the actual title is too long or ambiguous for quick identification.

OUTLINE OF CONTENTS

I. FORM OF WORK

A. Major Compendiums and Handbooks

Compendium of Meteorology (T. F. Malone, *ed.*), 11A–1
Handbuch der Physik, Band 48, Geophysik II, 11A–7
Handbuch der Geophysik, Vol. 8, Physik der Atmosphäre, Vol. 1 (Linke and Möller, *eds.*), 11A–8
Advances in Geophysics (Landsberg and Van Mieghem, *eds.*), 11A–9
Hann-Süring Lehrbuch der Meteorologie, 11A–51
Handbook of Meteorology (Berry, Bollay and Beers), 11A–32
Dynamic Meteorology and Weather Forecasting (Godske, Bergeron, Bjerknes and Bundgaard), 11A–53
Treatise on limnology, Vol. I (Hutchinson, G.), 11A–53
The Quaternary Era . . . Glaciation (Charlesworth), 11A–40
Vistas in Astronomy (Beer, *ed.*), 11A–30

B. Major Textbooks

General Meteorology, 3rd ed. (Byers), 11A–20
Weather Analysis and Forecasting, 2d ed., Vol. 1 and 2 (Petterssen), 11A–14
Polar Aurora (Störmer), 11A–19
Fizika moria [Physics of the sea] (Shuleĭkin), 11A–18
Kurs klimatologii, Chast' 1, 2 & 3 (Alisov, Drozdov, and Rubinshteĭn), 11A–16
Upper Atmosphere, 2d ed. (Mitra), 11A–13
Teoreticheskaia Gidromekhanika [Theoretical Hydromechanics] (Kochin, Kibel' and Roze), 11A–15
Neue Methoden der Wetteranalyse und Wetterprognose (Scherhag), 11A–17
Statistics of Extremes (Gumbel), 11A–49

C. Collected or Selected Works—Memorial Volumes

Nederlands K. Meteorologisch Instituut, 1854–1954, 11A–75
Collected Scientific Papers, 1919–1949, Vol. 1, Meteorology (Academia Sinica), 11A–22
Meteorologiia i gidrologiia v Uzbekistane (Akademiia Nauk Uzbekskoĭ SSR), 11A–23
Atmosphere and the Sea in Motion: Rossby Memorial Volume (Bolin, Bert, *ed.*), 11A–33
Kochin, Nikolaĭ Evgrafovich, [Collected works], 11A–59
Shaw, Sir William Napier, Selected Meteorological Papers, 11A–84
Spasskiĭ, Mikhail Fedorovich, [Selected Works on the Physics of the Atmosphere], 11A–86
Voeĭkov, Aleksandr Ivanovich, [Selected works], 11A–97

D. Glossaries

Glossary of Meteorology (Huschke, Ralph E., *ed.*), 11A–10
Dictionary of Meteorological and Related Terms, English-Spanish, Spanish-English (Brazol), 11A–35
Handwörterbuch der Meteorologie (Keil, Karl), 11A–56
Meteorologischeskiĭ slovar' (Khromov and Mamontova), 11A–58
Anglo-russkiĭ meteorologicheskiĭ slovar' (Mamontova and Khromov), 11A–69
Meteorological Dictionary (Wadati, K., *ed.*), 11A–98

E. Bibliographies

Arctic Bibliography, Vol. 1–8 (Tremaine, Marie, *ed.*), 11A–102
Snow, Ice and Permafrost Bibliography, Vol. 1–14 (Hughes, Thomas E., *edl*), 11A–103
Bibliography of South African meteorological literature 1486–1948 (Venter, R. J., *comp.*), 11A–95

F. History

Outline of the History of Meteorology [in Russian] (Khrgian, A. Kh.), 11A–57
Wetterkunde. Wetterforschung. Geschichte ihrer Probleme (Schneider-Carius, Karl), 11A–82
Fortschritte in der Meteorologischen Forschung seit 1900 (Neis, B.), 11A–74

Chronology of Weather Science (Okada, T.), 11A–78
Beiträge zur Geschichte der Erkenntnis des Erdmagnetismus (Balmer, H.), 11A–26
Professor Abbe and the Isobars: the Story of Cleveland Abbe, America's First Weatherman (Abbe, T.), 11A–21
Old English Barometers (Bell and Bell), 11A–31

G. Meteorological and Geophysical Tables

Landolt-Börnstein Zahlenwerte und Funktionen—Band III, Astronomie und Geophysik, 11A–2
Linkes Meteorologisches Taschenbuch, 11A–3
Smithsonian Meteorological Tables (List, Robert J., *comp.*), 11A–4
Smithsonian Physical Tables (Forsythe, W. E., *ed.*), 11A–85
Handbook of Geophysics for Air Force Designers (Campen, C. F., Jr. et al., *ed.*), 11A–50
Physikalisch-statistische Regeln als Grundlagen für Wetter- und Witterungsvorhersagen (Baur, F.), 11A–29
World Weather Records, 1941–1950 (U. S. Weather Bureau), 11A–94

H. Atlases (World Wide) (Marine, Upper Air and Cloud)

International Cloud Atlas (WMO), 11A–5
Atlas oblakov [Cloud Atlas] (U.S.S.R.), 11A–91
Morskoĭ Atlas, Vol. 2 [Marine Atlas, Vol. 2] (Isakov, Shuleĭkin et al., *eds.*), 11A–6
U. S. Navy Marine Climatic Atlas of the World, Vol. 1–4, 11A–92
Climatological and Oceanographic Atlas for Mariners, Vol. 1, North Atlantic Ocean (U. S. W. B. and U. S. H. O.), 11A–93
Atlas teplovogo balansa [Atlas of Thermal Balance] (Budyko, M. I., *ed.*), 11A–25
Upper Winds Over the World (Brooks, Durst et al.), 11A–36
Upper Air Temperature Over the World, (Goldie, Moore and Austin), 11A–47
World Distribution of Thunderstorm Days (WMO), 11A–100

I. Local Climatological Atlases and Studies

Atlas över Sverige (Lundqvist, Magnus et al.), 11A–87
Bio-climatic Atlas of Israel (Ashbel), 11A–24
Atlas Climatológico do Brasil (Brazil. Conselho Nacional de Geografia and Serviço de Meteorologia), 11A–34
Klima-Atlas für das Gebiet der Deutschen Demokratischen Republik, 11A–45
Climatological Atlas of Canada (Thomas), 11A–89
Climatic Atlas of the United States (Visher), 11A–96
[Collection of Articles on the Climate of Bulgaria] (Krŭstanov, *ed.*), 11A–37
Climate and Weather in Arosa (Götz), 11A–46

J. Specialized Monographs and Technical Books

Green Flash (O'Connell, D. J. K.), 11A–77
Sonnenstrahlung und Lufttrübung [Solar Radiation and Atmospheric Turbidity] (Foitzik and Hinzpeter), 11A–44
Investigations on Light Scattering in the Earth's Atmosphere (Piaskovskaia-Fesenkova, E. V.), 11A–79
Hailstorms of the United States (Flora), 11A–43
Tornadoes of the United States (Flora), 11A–42
Dendroclimatic Changes in Semiarid America (Schulman, E.), 11A–81
Floods (Hoyt and Langbein), 11A–52
Snow Crystals: Natural and Artificial (Nakaya), 11A–73
Atmosfernyi ozon (Prokof'eva, I. A.), 11A–80

K. Specialized Handbooks

Handbook of Statistical Methods in Meteorology (Brooks, C. E. P. and Carruthers, N.), 11A–12
Handbook of Meteorological Instruments (Great Britain. Meteorological Office), 11A–48
Methods of Climatological Analysis of Meteorological Observations (Drozdov, O. A., *ed.*), 11A–65

L. Expeditions and Surveys (Scientific Results)

Basic Features of the Hydrology of the Pacific Ocean (Muromtsev), 11A–72
Morskaia Antarkticheskaia Ekspeditsiia na Dizel'-Elektrokhode "Ob'," 1955–1956, 11A–71
Deutsche Antarktische Expedition, 1938–1939, Wissenschaftliche Ergebnisse, 11A–41
Die Höhenwinde über dem tropischen und südlichen Atlantischen Ozean, (Kuhlbrodt), 11A–61
Meteorology of the Antarctic (van Rooy, *ed.*), 11A–70
[Basic Characteristics of Antarctic Climate and Weather] (Tauber), 11A–88
[Hydrological Regime of Antarctic Waters] (Makerov), 11A–68
A Radio-Meteorological Investigation in the South Island of New Zealand [Report of the Factual Data from the Canterbury Project], 11A–76
The Thunderstorm: Report of the Thunderstorm Project (Byers and Braham), 11A–38
[Spectral Reflectance of Natural Surfaces] (Krinov), 11A–60

M. Conference Proceedings

Exploring the Atmosphere's First Mile. Proceedings of the Great Plains Turbulence Field Program, Aug. 1–Sept. 8, 1953 (Lettau and Davidson, *eds.*), 11A–67
The Threshold of Space: Proceedings of the Conference on Chemical Aeronomy, June 25–28, 1956 (Zelikoff, M., *ed.*), 11A–101
Tropical Cyclone Symposium, Brisbane, Dec. 10–14, 1956. Proceedings, 11A–90
Symposium on Meteor Physics, Jodrell Bank Experimental Station, July 1954 (Kaiser, T. R., *ed.*), 11A–55
Artificial Stimulation of Rain: Proceedings of the First Conference, 11A–99.
Thunderstorm Electricity (Byers, *ed.*), 11A–39
Climatic Change: Evidence, Causes and Effects (Shapley, *ed.*), 11A–83

N. Minor Collections

The Earth and its Atmosphere (Bates, D. R., *ed.*), 11A–27
Space Research and Exploration (Bates and Moore, *eds.*), 11A–28
The Atmospheres of the Earth and Planets (Kuiper, G. P., *ed.*), 11A–62
The Sun (Kuiper, *ed.*), 11A–63
The Earth as a Planet (Kuiper, *ed.*), 11A–64
Das Gewitter (Israël, Hans, *ed.*), 11A–54

II. SUBJECT OF WORK

A. General Geophysics

Landolt-Börnstein Zahlenwerte und Funktionen, 11A–2
Handbuch der Physik—Geophysik, 11A–7
Handbuch der Geophysik, 11A–8
Advances in Geophysics, 11A–9
Handbook of Geophysics for Air Force Designers, 11A–50
The Earth as a Planet (Kuiper), 11A–64

B. General Meteorology

Compendium of Meteorology, 11A–1
Linkes Taschenbuch, 11A–3
Smithsonian Meteorological Tables, 11A–4
Glossary of Meteorology, 11A–10
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Handbook of Meteorology (Berry, Bollay and Beers), 11A–32
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C. Dynamic Meteorology

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Atmosphere and Sea in Motion (Rossby Memorial Vol.), 11A–33
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D. Synoptic Meteorology

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Weather Analysis and Forecasting (Petterssen), 11A–14
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The Atmosphere and Sea in Motion, 11A–33
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(a) *Radiation*

Handbook of Geophysics, Vol. 8, Radiation, 11A–8
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(b) *Cloud Physics and Electricity*

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Hailstorms of the U. S. A. (Flora), 11A–43
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(d) *Aeronomy*

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The Earth and its Atmosphere (Bates), 11A–27
Handbook of Geophysics for Air Force Designers, 11A–50
Meteors (Kaiser), 11A–55
The Earth as a Planet (Kuiper), 11A–64
Green Flash (O'Connell), 11A–77
Atmospheric Ozone (Prokof'eva), 11A–80

(e) *Astrophysics and Space Science*

Space Research and Exploration (Bates), 11A–28
Vistas in Astronomy (Beer), 11A–30
The Atmospheres of the Earth and Planets (Kuiper), 11A–62
The Sun (Kuiper), 11A–63

F. Climatology

(a) *General Climatology*

Course in Climatology (Alisov, Drozdov and Rubinshteĭn), 11A–16
World Weather Records (U. S. W. B.), 11A–94
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Arctic Bibliography, 11A–102

(b) *Climatic Changes*

Quaternary Glaciation (Charlesworth), 11A–40
Dendroclimatic Changes (Schulman), 11A–81
Climatic Change (Shapley), 11A–83
Selected works of A. I. Voeĭkov, 11A–97

(c) *Agricultural and Bioclimatology*

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Selected works in Agrometeorology (Voeĭkov), 11A–97

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Climate of Arosa (Götz), 11A–40
Atmosphere's First Mile (Lettau), 11A–67
Meteorology of Antarctic (van Rooy), 11A–70
Climate of Antarctic (Tauber), 11A–88
Climate of Russia (Voeĭkov), 11A–97

(e) *Climatic Atlases*

Climatic Atlas of Brazil, 11A–34
Climatic Atlas of East Germany, 11A–45
Atlas of Sweden, 11A–87
Climatic Atlas of Canada (Thomas), 11A–89
Climatic Atlas of the U. S. A. (Visher), 11A–96

G. Instruments and Methods of Observation

(a) *Instruments*

Old English Barometers (Bell), 11A–31
Handbook of Meteorological Instruments (British Met. Office), 11A–48

(b) *Methods of Analysis and Compilation*

Handbook of Statistical Methods (Brooks), 11A–12
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H. Institutions

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11A–1 551.5(082):061.2

†**Compendium of Meteorology,** ed. by Thomas F. Malone. Prepared under the direction of the Committee on the Compendium of Meteorology: H. R. Byers, H. E. Landsberg, H. Wexler, B. Haurwitz, A. F. Spilhaus, H. S. Willett, H. G. Houghton (chairman). Boston, American Meteorological Society, **1951.** 1334 p. charts, graphs, tables, refs. and bibliogs. Price: $12.00. **DWB**—This is by far the most valuable single work of the decade. The purpose of the **Compendium** was to make a detailed survey of meteorology up to 1951 by subjects. The 108 review type articles by 102 outstanding authors are divided into 25 sections according to the following broad subject headings: 1) Composition of the atmosphere, 2) Radiation, 3) Meteorological optics, 4) Atmospheric electricity, 5) Cloud physics, 6) Upper atmosphere, 7) Cosmical meteorology, 8) Dynamics of the atmosphere, 9) General circulation, 10) Mechanics of pressure systems, 11) Local circulation, 12) Observations and analysis, 13) Weather forecasting meteorology, 14) Tropical meteorology, 15) Polar meteorology, 16) Climatology, 17) Hydrometeorology, 18) Marine meteorology, 19) Biological and chemical meteorology, 20) Atmospheric pollution, 21) Clouds, fog and aircraft icing, 22) Meteorological instruments, 23) Laboratory investigation, 24) Radiometeorology and 25) Microseisms. No particular attempt was made to avoid duplication in subject matter. The references accompanying each article have been carefully edited, making the volume a good bibliographic source. An excellent 18 page subject index is provided. (Same item as 3.3–1, March 1952, and 6A–140, Jan. 1955; for listing of contents, Vol. 3, No. 2, *see,* p. 174, Feb. 1952, *MAB.*) *Subject Headings:* **1. Meteorology 2. Compendium of Meteorology 3. Bibliography on meteorology 4. Progress in meteorology. I. American Meteorological Society, Committee on the Compendium of Meteorology II. Malone, Thomas F.** (*ed.*) **III. U. S. Air Force. Cambridge Research Center. Geophysics Research Division.**—*M.R.*

11A–2 551.5(02) 55.03(02) 52(02)

†*Landolt, Hans H. and Börnstein, Richard, **Zahlenwerte und Funktionen aus Physik, Chemie, Astronomie, Geophysik und Technik.** [Tables and equations in physics, chemistry, astronomy,

geophysics and technology.] 6th ed. Edited by Arnold Eucken. Berlin, Springer, **1950–52.** Vol. 3, issued **1952, Astronomie und Geophysik.** Prepared by Georg Joos; ed. by Julius Bartels and Paul ten Brüggencate. 795 p. figs., tables, charts, bibliogs. **DWB, DLC** (QC61.L3)—Next to the **Compendium of Meteorology** this volume of LANDOLT-BÖRNSTEIN is the most comprehensive undertaking in meteorological publication of the decade. It would be impossible to review in detail all of the vast amount of physical data from all parts of the earth, as well as empirical data, which are useful in theoretical calculations of the earth, sea, atmosphere, sun, moon or planets which have been included. The section on **Astronomy,** a sub-section by H. SIEDENTOPF (p. 30–34), deals with data on the astronomical influence of the earth's atmosphere (astronomic refraction, extinction by gases and by haze in various wave lengths, scintillation and twilight or night sky luminescence). Another sub-section (p. 58–59) deals with planetary atmospheres and their composition (including the earth). One by WALDMEIER (p. 60–76) covers the solar atmosphere: sunspots, faculae, chromosphere eruptions and protuberances, corona, the 11-year sunspot cycle and solar activity (including a table of monthly and annual relative sunspot numbers 1749–1950), and magnetic field of the sun. The next section gives data on planets, the moon and asteroids or planetoids, temperature, albedo of planets, meteorites, heat radiation from planets, etc. The section on **Geophysics** contains sections on gravity, geodesy, tides, minerals, rocks, seismology, magnetism of the earth, and temperature of the earth's interior; that on **Oceanography** (p. 426–541) by G. DIETRICH, J. JOSEPH et al. gives hundreds of tables and references on physical and chemical constants of the oceans, sea ice, effect of atmospheric pressure, optics, surface temperature (diurnal and secular variation), salinity, and dynamic oceanography (currents, waves, austausch, tides, ice conditions). A section (p. 542–563) by FRIEDRICH takes up **Hydrography** of flowing water, lakes, ground water, etc., including evaporation, effect of precipitation, hydrologic cycle, etc. The section on **Meteorology** (p. 564–717) has subsections by R. PENNDORF on atmospheric structure, pressure, temperature and density (p. 564–584); by F. MÖLLER and CHR. JUNGE on CO_2 composition, aerosols, cloud physics and precipitation (hail, drop speed and size, etc.) and on ozone content by F. W. GOTZ; a sub-section on weather networks and observations by K. KEIL (p. 594–602), on climate by R. GEIGER (p. 603–656), with separate section by K. KNOCH and A. SCHULZE on climatic tables; J. BARTELS, W. DAMMANN, and H. FLOHN on various aspects of climate (variations, cycles, bioclimatology, statistical calculations, climatic extremes, etc.). Other sections (p. 657–666) are on upper air winds by K. KEIL; on austausch by H. LETTAU; on tidal motions in the atmosphere; on radiation and atmospheric optics, and on atmospheric electricity. A section on **Physics of the upper atmosphere** (p. 718–781), gives tables and graphs on the ionosphere (W. DIEMINGER), variations in terrestrial magnetism (J. BARTELS), aurora (L. HARANG) and light of the night sky (R. PENNDORF). Finally, a section by G. POGADE lists 354 geophysical, meteorological and oceanographical publications (current and historical) which are scientifically important, together with the publishers, editors and period of publication. (*Same item as* 4.4–9, April 1954, *MAB.*) *Subject Headings:* **1. Geophysical tables 2. Geophysics periodicals lists 3. Meteorological tables 4. Astrophysical tables 5. Oceanographic tables 6. Geophysics subject bibliographies. I. Eucken, Arnold** (*ed.*) **II. Joos, Georg** (*ed.*) **III. Bartels, Julius** (*ed.*) **IV. ten Bruggencate, Paul** (*ed.*).—*M.R.*

11A–3 551.5(02)

*†Linke, Franz, **Linkes Meteorologisches Taschenbuch.** [Linke's meteorological handbook.] New ed. by Tor Bergeron (et al). Ed. by Franz Baur. Leipzig, Geest & Portig, **1951–1957.** 3 vol. **Vol. 1,** issued **1951.** 359 p. **Vol. 2,** issued **1953.** 724 p. 194 tables, 9 graphs (fold.), 71 figs., refs. throughout. **Vol. 3,** issued **1957.** 441 p. 117 figs. (incl. photos), bibliogs. throughout. (Various chapters have been abstracted separately in previous issues of *MAB.*) **DLC** (QC864.L53), **DWB**—The new edition of LINKE'S famous **Taschenbuch** contains essential material from several of the volumes of the previous editions, revised and brought up to date, and in addition, many new chapters. For instance: in Vol. 1, Ch. I, by KARL KEIL, data is given on the principal radio broadcasting stations throughout the world. Ch. II is BERGERON'S **Sechssprachiges Meteorologisches Wörterbuch** (2500 words). Ch. IV, by KARL KNOCH and ALFRED SCHULZE, gives the location of the main weather stations in every part of the world and monthly and annual means of pressure and temperature for **1901–30** for these stations. Ch. V, by R. MUGGE, presents the International Cloud Classification; Ch. VI, the U.D.C. for meteorology and related subjects (in German). Ch. VII is an expanded historical chronology by CARL KASSNER (up to 1947). Vol. 2 contains a vast amount of mathematical and physical data, constants, formulas, equations, graphs, etc. used in meteorology. algebra, geometry, calculus, vector and tensor analysis, errors and smoothing, interpolation, probability, gas laws, thermodynamics, statics, dynamics (fields and eddy motion), continuity and vertical motion, austausch, aerological observations and their computation, cross sections along 3 meridians, astronomic and geodetic tables, physical tables, pressure and density tables, thermodynamics and cloud physics, radiation, optics, electricity, ionosphere, long period records, and, finally, conversion tables. The six main headings in the third volume of the **Taschenbuch** cover the following subjects: I. Basic units and formulas used in atmospheric radiation investigations

(FRITZ MÖLLER and FRIEDRICH VOLZ); II. Particular atmospheric-optic phenomena (RUDOLF MEYER); III. Instruments and measurement techniques used in atmospheric electricity studies (HANS ISRAËL and HANS DOLEZALEK); IV. Basic concepts and known facts in bioclimatology (EMIL FLACH); V. Meteorological instruments used for measurements at the earth's surface (WALTER GRUNDMANN); VI. Aerological instruments (FRIEDRICH WOELFLE). Each section is a major and systematic review of up-to-date knowledge on the various aspects of the subject, and most sections contain extensive bibliographies (through 1956). An overall subject index is appended. (*Same items as* 4.9–12, Sept. 1953; 5.3–8, March 1954 and 9.5–6, May 1958, *MAB.*) *Subject Headings:* **1. Linke's Taschenbuch 2. Meteorology handbooks 3. Radiation constants 4. Optical phenomena 5. Atmospheric electricity instruments 6. Bioclimatic surveys 7. Meteorological instruments 8. Aerological instruments 9. Radiosondes 10. Conversion tables 11. Mathematical tables 12. Physical constants and tables 13. Meteorological constants and tables. I. Baur, Franz** (*ed.*). —*M.R.*

11A–4 551.501(083)

***Smithsonian meteorological tables.** 6th rev. ed. Comp. by Robert J. List. *Smithsonian Institution, Publication*, 4014, **1951.** 527 p. Almost entirely tables. **DWB, DLC**—The first edition of these famous **Tables** was issued in 1893, and revised editions in 1896, 1897, 1907, 1918 and 1931. The tables remained essentially the same through all these years. A reprint was made in 1939, but with no additions or revisions. The great expansion of the scope and interest in meteorology during the war (1939–45) led to the decision to completely revise the work from cover to cover. A committee of experts from the U. S. Weather Bureau and the Smithsonian Institution (H. WEXLER, R. D. FLETCHER, J. R. FULKS, L. P. HARRISON, W. C. JACOBS, and others, with the assistance of ROSS GUNN, I. F. HAND, J. B. LEIGHLY, R. B. MONTGOMERY, S. FRITZ, J. A. DUERKSEN and L. B. ALDRICH) aided in preparation of text and tables and succeeded in making this revision possible after 3 years of intensive work. Some of the new tables are: conversion of temperature lapse rates from metric to English units and vice versa, millibars to inches, millibars to millimeters, nautical miles to kilometers and vice versa, miles per hour to knots, kilometers per hour to knots, meters per second to knots and vice versa; geostrophic wind, constant pressure surface for 100 geopotential meter and 200 geopotential foot contours; gradient wind, coriolis parameter and latitude variation, Rossby's long wave formula; thickness of strata between standard isobaric surfaces, and mean vertical temperature; standard atmosphere (NACA and ICAN) and related altimetry tables. A new section (VIII) entitled **Miscellaneous properties of air and airborne particles** contains many tables on chemical and acoustical properties of the atmosphere, viscosity, conductivity, terminal velocity of falling drops, etc. Sec. IX gives properties of water substance and soils (ice, snow, sea water, rocks). Sec. X contains numerous nomograms and tables for radiation, absorption, albedo, visibility, precipitable water, enthalpy and entropy. Hygrometric tables have been elaborated and include dew point conversion charts for both Centigrade and Fahrenheit and for ice and water. The list of meteorological stations in the world and the International Meteorological symbols have been deleted. (*Same item as* 2D–35, April 1951 and 3.1–19, Jan. 1952, *MAB.*) *Subject Headings:* **1. Meteorological constants and tables 2. Barometer reduction 3. Hygrometry.**—*M.R.*

11A–5 551.576.12:061.1

†International Cloud Atlas. Geneva, World Meteorological Organization, **1956.** 2 vol. **Vol. 1,** [Text]. 155 p. figs., forms, foot-refs. **Historical bibliog. of cloud classification,** p. 137–139. **Bibliog. of cloud nomenclature,** p. 140–146. Vol. 2, [**Plates**]. 224 plates (123 in black and white; 101 in color), 15 p. of appendix. **DWB** (M76.1 I61). Also Abridged ed., with same title, issued Geneva, **1956.** 62 p. of text. 72 plates (42 in black and white; 30 in color). And French language ed., **Atlas internationale des nuages.** Geneva, **1956.** 68 p. of text. 72 plates, etc. both **DWB**— The old **International Cloud Atlas** issued by the IMO before World War II (1939) was thoroughly revised and enlarged so that it is now issued in two volumes in the unabridged edition, with a separate abridged edition and in an edition for use in airways observing, not to mention the French editions. Vol. I gives the history of cloud classification from 1800 to date, the appearance, classification, abbreviations, symbols, definitions, descriptions of types, orographic effects, appearance from above, special types of clouds, hydrometeors, etc., plus instructions for observation, recording, coding, etc., and a bibliography on cloud classification and nomenclature. Vol. II consists of more than 200 plates (over half in color), representing photographic illustrations of all cloud types obtained from all parts of the world. Remarkable photos of clouds from aircraft and special cloud and weather types are included (contrails, hurricanes, cloud formations, roll clouds, waterfall clouds, rainbows, volcanic clouds). The abridged edition contains 72 of the >200 plates in Vol. II, plus instructions for observing, coding, etc. clouds and other phenomena. (*Same item as* 8.11–14, 8.11–15, Nov. 1957 and 8.8–35, Aug. 1957, *MAB.*) *Subject Headings:* **1. International Cloud Atlas 2. Cloud atlases 3. Cloud nomenclature 4. Cloud codes. I. World Meteorological Organization.**—*M.R.*

11A–6 551.5(912) 551.46:551.582.3(26)

Morskoĭ Atlas, Vol. 2, Fiziko-Geograficheskiĭ. [Marine atlas, Vol. 2, Physicogeographical part.] Ed. by I. S. Isakov, V. V. Shuleĭkin and L. A. Demin. (Moscow), Glavnyĭ Shtab Voenno-Morskikh Sil, **1953.** unpaged. 52 cm. 76 charts (colored), some double page. At head of cover-title: Ministerstvo Oborony SSSR. **DLC** (G1060.R8 1950 MAP). Also various reviews and translations as follows: Senkowski, H., **Radziecki "Atlas Morski,"** in *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 7(1/2):82–83, **1954. DWB, DLC.** Shuleĭkin, V. V., **Morskoĭ atlas, 2, Fiziko-geograficheskiĭ.** *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 3:299–301, **1954. DLC.** Salishchev, K. A., **Morskoĭ atlas.** *Nauka i Zhizn*, Moscow, No. 6:46–47, **1954.** Transl. of Salishchev review into English by L. G. Robbins; ed. by W. R. Deebel,.and issued as *U. S. Hydrographic Office, H. O. Translation*, No. 314, Oct. **1955.** 4 p. Mimeo. **DN-HO.** Transl. into English by L. G. Robbins of Vol. 2, p. XV–XVIII, issued as *U. S. Hydrographic Office, H. O. Translation*, No. 405, Oct. **1956.** 23 p. Mimeo. **DN-HO.** Also extensive review of Vol. 2 by H. W. Dubach in *American Meteorological Society, Bulletin*, 40(1):14–40, Jan. **1959** and in *Tellus*, 11(3):364–365, Aug. **1959. DWB.** And, finally, Dubach, H. W. and Slessers, M. A., **Evaluation of the "Morskoĭ Atlas" (with translations from Vol. 1 and 2).** *U. S. Hydrographic Office, Technical Report* TR-38, March **1958.** 4–41P. **DWB** (M(055)U582t)—Vol. I of the monumental 3 volume marine atlas is devoted entirely to geographic and bathymetric charts of all of the world's oceans, seas, bays and harbors; Vol. II contains most of the physical, geodetic, astronomical and environmental charts (expeditions, climate, oceanography, ice); Vol. III is devoted to the political aspects of world geography: wars from the earliest times to the 20th century, etc. The only atlas that in any way approaches this in quality is the famous **Bartholomew's Atlas** which is now over half a century out of date, and not nearly as elaborate or far-reaching, either in subject matter, geographical extent or detail of data. The atlas is intended for use in marine (naval) operations, navigation, etc., but is also of great convenience for students and scientific workers interested in world geographic conditions. The **Atlas** is the work of many institutions, among them the Akademiia Nauk, the Central Geophysical Observatory, the State Oceanographic Institute and the Institute of Oceanology of the Academy of Science. In Vol. II of this ambitious and elegantly reproduced marine atlas there are several hundred separate but well integrated climatic or oceanographic, not to mention geomagnetic, charts, maps, diagrams, etc. covering the physical conditions over the major and minor oceans and seas. In some cases the data only extends to 60° or 70°N or S lat., but in other instances the Polar seas are also included. The charts are of all sizes, ranging from full, 2-page spreads to inset charts and charts with many graphical presentations inserted in appropriate places on the charts themselves. The charts are all in many colors, with excellent contrast and high quality cartography. Sources of data and period of record used are not given. For each plate there is a page of descriptive text. This textual material has, as do the charts themselves, an analytical approach which is unusual in this "atlas" type of presentation of climatic data. The **oceanographic charts** are found on Plates 4–37, the **climatological charts** on Plates 41–69, and the **geomagnetic charts** on Plates 70–71. **Geodetic** and **astronomical charts** are found on Plates 72–76. The 300 or more **climatic charts** are on scales ranging from 1:50 million to 1:300 million. Subjects include: thermal balance (solar radiation, evaporative heat loss, turbulent thermal exchange between earth and atmosphere, heat gained or lost at sea surface by ocean currents and by evaporation); mean Jan. and July air temperature; mean Jan. and July latitudinal temperature anomaly; difference of air and water temperature (Feb., May, Aug. and Nov.); pressure and wind in Jan. and July; seasonal air mass distribution; movement and frequency of cyclones and anticyclones, Jan. and July; surface and 500 mb pressures; climatic zones of the earth; total precipitation over earth; annual temperature and precipitation regimes; monthly air temperature, wind, cloud and fog, Jan.–Dec.; seasonal precipitation; pressure, wind and storm frequencies by months; winds aloft each season; annual upper air temperature regime for Reykjavik, St. Thomas, San Diego, Pensacola, Pearl Harbor, Coco Solo, Djakarta, Gibraltar and Aldergrove. **Oceanographic charts** include charts of oceanographic expeditions from 1800 to 1950, of temperature, salinity and density, cross sections of each separate ocean and strait, polar ice, currents, tides, waves. **Geomagnetic charts** include world charts of magnetic inclination and of declination, and of the horizontal and vertical components for 1950, respectively. **Astronomical charts** include time of sunrise and sunset and duration of twilight for the earth at all seasons, and stellar, solar, planetary and lunar data. Most charts are modified Mercator projections, with exception of small inset charts and charts of Polar regions. (*Same item as* 10.9–31, Sept. 1959, *MAB.*) *Subject Headings:* **1. Soviet marine atlases 2. Morskoĭ Atlas 3. Marine atlas of world 4. Climatic charts of world 5. World oceans and seas. I. U.S.S.R. Ministerstvo Oborony II. Isakov, I. S.** (*ed.*) **III. Shuleĭkin, V. V.** (*ed.*) **IV. Demin, L. A.** (*ed.*)—*M.R.*

11A–7 550.3(02)

***†Handbuch der Physik, Band 48, Geophysik II.** [Handbook of Physics, Vol. 48, Geophysics, Pt. 2.] Berlin, Springer-Verlag, **1957.** 1045 p. numerous figs., tables, foot-refs., bibliogs. and eqs. **DWB** (551.03 H236), **DLC** (QC21.H327) (For listing of contents, *see* Pt. III, p. 1007, July 1957,

MAB.) Review by B. Gutenberg in *Science*, Wash. D. C., 126(3270):408, Aug. 30, **1957.** Review by J. Bartels of each paper, in *Annales de Géophysique*, Paris, 13(2):160-165, **1957.**—This is one of the outstanding works of the decade. Well (and expensively) bound, containing 17 comprehensive "reviews" of all available theoretical knowledge and quantitative data on meteorological, oceanographic, tidal and volcanological subjects of current interest: 1) Dynamic meteorology, 2) Radiation, 3) Visibility, 4) Polarization of skylight, 5) Rain or cloud drop diffusion, 6) Ozone, 7) Meteors, 8) Sound propagation, 9) Cloud physics, 10) Atmospheric electricity, 11) Oceanograph, 12) Ocean waves, 13) Tides, 14) Earth tides, 15) Tidal waves, 16) Atmospheric tides, 17) Physical volcanology. Each article is written by a recognized world authority on the subject. Foot-references and bibliographies, photographs and drawings, nomograms and data tables abound. Nine chapters are in English, 7 in German and 1 in French. A detailed subject index in English and one in German are appended. Another volume (Pt. III), will contain 16 articles on upper atmospheric phenomena (aurora, air-glow, ionospheric winds, cosmic radiation, geomagnetism, etc.) also by noted scientists in each special field (NICOLET, KAPLAN, CHAPMAN, MEINEL, BARTELS, FERRARO and others). (*Same item as* 8.9–1, Sept. 1957, *MAB.*) *Subject Headings:* **1. Geophysics handbooks 2. Handbook of Geophysics 3. Geophysics. I. Flügge, S.**—*M.R.*

11A–8 551.521.1:551.593(02)

***†Handbuch der Geophysik, Vol. 8, Physik der Atmosphäre,** Vol. 1, issued Berlin, Borntraeger, **1942–1956.** Ed. by F. Linke (deceased) and F. Möller (*Mainz*). 898 p. (Issued unbound in 5 installments, or "Lieferung.") [For abstract on the first 3 "Lieferung" (issued **1942**), *see* 5.10–2. For abstracts on Chs. 12, 13 and 14 in "Lieferung" 4–5, *see* 6.11–214 (Ch. 12); 10.10–38, 7.1–335 (Ch. 13); 10.10–37 (Ch. 14).] **DWB**—This elaborate volume of the famous Handbook of Geophysics contains detailed chapters on all aspects of radiation as affecting the atmospheric sciences. The first "Lieferung" discusses: (1) the sun as source of radiation and its physical characteristics; (2) atmospheric aerosols; (3) fundamental laws of radiation, illumination, etc.; (4) instruments and methods of measurement of radiation and light, spectroscopy, etc.; (5) theories of sun and sky radiation (scattering, extinction, polarization) and (6) atmospheric attenuation, all by the late F. LINKE. Another chapter (7) including F. LINKE on short wave sky radiation and PAUL GÖTZ on the light of the night sky, (8) by PAUL GRUNER on twilight phenomena and (9) by CHR. JENSEN on the polarization of sky light (cont. in "Lieferung" 3) comprise "Lieferung" 2. A chapter (10) on visibility by F. LINKE, one (11) on refraction and reflection phenomena in water drops and ice crystals by RUDOLF MEYER and one (12) on long wave radiation and radiative balance of the atmosphere by F. LINKE and F. MÖLLER comprise the main part of "Lieferung" 3. "Lieferung" 4, issued in 1955, contains Chs. (12) on solar and sky radiation and optical properties of ocean and lake water by F. LAUSCHER, and (13) by R. MEYER on atmospheric refraction. Finally, "Lieferung" 5 (issued in **1956**) contains articles (Ch. 14) on optics of haze droplets by F. VOLZ, and one final page on coronas. A final "Lieferung" to appear in 1960 will contain the remainder of this article with material on halos, phenomenon known as "glories" and related phenomena. The volume contains an enormous amount of theoretical as well as experimental data (in the form of tables and graphs), and constitutes a compendium containing a comprehensive review of the knowledge and literature to date in these highly technical fields of physics of the atmosphere. *Subject Headings:* **1. Radiation handbooks 2. Solar radiation 3. Optical phenomena. I. Linke, Franz** (*ed.*).—*M.R.*

11A–9 550.3(08)

Advances in Geophysics, ed. by H. E. Landsberg and J. Van Mieghem. N. Y., Academic Press. Vol. 1–6, issued **1952–1959.** Vol. 1, **1952** (362 p.). Vol. 2, **1955** (286 p.). Vol. 3, **1957** (378 p.). Vol. 4, **1958** (456 p.). Vol. 5, **1958** (325 p.). Vol. 6, **1959** (471 p.). figs., tables, numerous refs. and bibliogs., and indexes in each vol. (Contents of the issues appear in Pt. III, *MAB.* All articles are regularly abstracted separately.) **DWB, DLC** (QC806.A3)—When this series started in 1952, the hope was expressed by the reviewer that "over a period of ten years something of permanent reference value will be achieved, and in a form that will not burden the eyes or arms." The 6 volumes now available (and another in press) come up to these earlier expectations, for in less than a decade we now have a durable, convenient and attractive set of books containing thorough and systematic reviews of knowledge to date in processing geophysical data, statistical techniques, general circulation, meteorite probes of the upper atmosphere, estuarine hydrography, aeromagnetic surveying, weather radar, objective weather forecasting, wind waves, radioactive geochronology, seismographs, arctic ice islands, sky light polarization, subcontinental structure, heat flow through sea bottom, earth's interior, ground-water geophysical exploration, satellite research, atmospheric chemistry, auroral theory, meteorites and their effects, smoothing and filtering techniques, earth tides, ocean tides, Polar Years and IGY, microseisms, size and shape of Earth, UV-absorption in upper atmosphere, cloud physics and modification, and the latest volume (6) devoted in its entirety to nearly 50 papers on atmospheric diffusion, pollution, turbulence and transport. Among the prominent contributors have been BELLAMY, COURT, BOLIN, F. WHIPPLE, N. C. GERSON, MARSHALL, GRINGORTEN, BENIOFF,

Crary, Sekera, Byerly, Revelle, Singer, Junge, La Paz, Chamberlain, Gutenberg, Doodson, Watanabe, J. E. McDonald, Monin, Obukhov, Pasquill, Panofsky, G. I. Taylor, Deacon, R. W. Davies, Sutton, Sheppard, Scorer, Machta, Palm and many others. A mass of information and data, similar to the **Compendium of Meteorology** in that it comprises an orderly survey and analysis of the literature on upward of 100 subjects cutting across the entire field of Geophysics, written at leisure by as many of the world's experts in each specific field, and edited by experienced scientists used to editing high quality technical and scientific material and published by an equally experienced scientific publishing house at a modest price per volume, has been made available. For previous abstracts on this title, *see* 4.4-10, 6.7–1, 8.8–1, 9.9–2, 10.7-2, *MAB.*) *Subject Headings:* **1. Advances in Geophysics 2. Geophysics. I. Landsberg, H. E.** (*ed.*) **II. Van Mieghem, J.** (*ed.*). —*M.R.*

11A–10 551.5(030.8)

Glossary of meteorology, ed. by Ralph E. Huschke. Sponsored by U. S. Dept. of Commerce, Weather Bureau; U. S. Air Force, Air Weather Service, MATS and Geophysics Research Directorate; U. S. Army Signal Corps and U. S. Navy Office of Naval Research. Boston, American Meteorological Society, **1959.** 638 p. **DWB**—The last such compilation was issued by the U. S. Weather Bureau in 1946, based on a 40 years accumulation of definitions by Charles F. Talman, edited posthumously by Major Thiessen and James K. McGuire. The present glossary, comprising >7000 terms and their definitions, was undertaken by the American Meteorological Society with support from the U. S. W. B. and Department of Defense. The definitions were prepared by experts for broad subject areas such as dynamic meteorology, physical meteorology, climatology, statistics, etc. The vast majority of the definitions are original in this edition, sources are freely cited, cross-references profusely indicated, synonyms, abbreviations and symbols placed in parentheses before the definition, dual definitions given in order of relative importance or usage, most terms given in straightforward (not inverted) style, in singular number and as nouns or noun phrases. Many borderline terms in physics, radio technology, statistics, astrophysics, oceanography, hydrology, etc. are included, but the bulk of the glossary is confined to purely meteorological terms. A number of obsolete terms are included but are so indicated. A considerable number of terms relating to special winds in all parts of the earth are also included. A few equations have been incorporated for the purpose of specificity but not to replace clear verbal definition. Illustrations were not included because of the prohibitive cost, time and volume factors inherent in such presentation. The verbal definitions are often quite comprehensive, for instance under Standard Atmosphere, specifications are given of 8 or 9 parameters for each of the two current atmospheres: 1) the ICAO (1952) standard atmosphere, and 2) the ARDC (1956) model atmosphere, which extended the ICAO atmosphere to 500 km, and 4 other definitions of the term for special purposes. Terms and cross-references are given in easy-to-read bold face type. The format is handy and the binding adequate but not ornate. (*Same item as* 10.9-1, Sept. 1959, *MAB.*) *Subject Headings:* **1. Glossary of meteorology 2. Meteorological glossaries. I. Huschke, Ralph E.** (*ed.*).—*M.R.*

11A–11 551.5(02) 551.509 551.511

*†Godske, C. L.; Bergeron, Tor; Bjerknes, Jakob A. V. and Bundgaard, Robert C., **Dynamic meteorology and weather forecasting.** In continuation of **Dynamic meteorology and hydrography** (by V. Bjerknes and collaborators) and **Hydrodynamique physique avec applications à la météorologie dynamique.** [Physical hydrodynamics with applications to dynamic meteorology.] (by) V. Bjerknes; J. Bjerknes; H. Solberg and T. Bergeron. Published jointly by American Meteorological Society, Boston, and by Carnegie Institution of Washington, Wash., D. C., **1957.** (Foreword dated 1949; Manuscript submitted Feb. 1951). 800 p. numerous figs., tables, eqs. Bibliog. at end of each chapter. *Carnegie Institution of Washington, Publication,* No. 605. **DLC.** Review by Sverre Petterssen in *Science,* Wash., D. C., 125(3252):829–830, April 26, **1957.**—This monumental volume is one of the most impressive works on meteorology of the decade. The work of revising and bringing up to date the classical work of V. and J. Bjerknes et al. (1933–34) on **Physical hydrodynamics** was completed in 1948, before the death of the elder Bjerknes (who wrote the Preface in Feb. 1949, and to whose memory the volume is dedicated). Since most of the progress in meteorology in the past decade has been along lines of mechanization, automation and the like, the basic material in the book has not depreciated in the decade since the book was written—only a few topics such as microwave (radar) meteorology, numerical prediction, turbulent diffusion, the jet stream and cloud physics, have not been treated as fully as would be the case if the book were written today. It is not possible to mention all of the detailed titles of the 109 sub-chapters arranged under 18 following major chapters in 6 sections: I. Thermodynamics and statics of the atmosphere—(1) thermodynamics, (2) statics, (3) quasi-static diagnosis of atmospheric fields, (4) radiation processes; II. Kinematics of the atmosphere—(5) the vector field, (6) simple kinematic processes and principles, (7) 2-dimensional kinematic methods in forecasting; III. Hydrodynamics of the atmosphere—(8) atmospheric equations of motion and circulation theorems, (9) oscillating and

circulating motions, (10) wave theory of cyclones and applications, (11) Vorticity, gradient winds, divergence and orographic effects, (12) turbulence; IV. Climatological and Synoptic models—(13) average fields of temperature, pressure, heat transfer, etc., (14) air masses and fronts, (15) dynamical analysis of cyclones and anticyclones, (16) atmospheric tides and thermal, orographic, frictional and local modification of disturbances or currents; V. Weather forecasting—(17) synoptic analysis (observation codes, surface, upper air and composite maps), (18) forecasting (numerical, synoptic, special and extended). Excellent bibliographies, running into over 1000 completely cited references are appended to each chapter. The historical and mid-historical material along the lines of the above subjects are not by any means slighted—very little material after 1948 (some as late as 1951) has been incorporated. (*Same item as* 8.7–5, July 1957, *MAB.*) *Subject Headings:* **1. Dynamic meteorology textbooks 2. Synoptic meteorology textbooks 3. Meteorology bibliographies. I. Bjerknes, V. II. American Meteorological Society.**—*M.R.*

11A–12 551.5:519.2(02)

*†Brooks, C. E. P. and Carruthers, N., **Handbook of statistical methods in meteorology.** London, H.M. Stationary Office, **1953.** 413 p. 75 figs., tables, refs., eqs. At head of title: *MO* 538. **DWB, DLC** (QA276.B73)—This book sets out formulas, methods and examples of the application of modern statistical ideas to meteorological data. Pt. I, **The distribution of observations,** deals with "observations" as individual phenomena, their nature and errors, probability, one-dimensional frequency distributions, mean values, standard deviation, skewness, kurtosis, and significance tests. The properties of various types of distribution—binomial, normal, Pearson curves, etc.—are summarized. A chapter is included on the analysis of variance. Pt. II, **Related variables,** discusses space distributions, vector quantities, correlation, smoothing, interpolation and curve fitting. Pt. III, **Time series,** includes persistence, harmonic analysis, and examination of various methods of periodogram analysis. Appendices give useful statistical formulas and tables. Nearly all the examples and exercises are taken from meteorology. (*Same item as* 4.6–2, June 1953 and 10A–12, Jan. 1959, *MAB.*) *Subject Headings:* **1. Statistical analysis I. Great Britain. Meteorological Office.**—*C.E.P.B.*

11A–13 551.510.53(02)

*†Mitra, Sisir Kumar (*Prof. Physics, Calcutta Univ.*), **The upper atmosphere.** 2d ed. Calcutta, The Asiatic Society, **1952.** 713 p. figs., tables, bibliog. p. 644–668, eqs. (*Asiatic Society, Monograph Series,* Vol. 5). **DLC** (QC879.M49 1952). Transl. into Russian by G. V. Rozenberg and E. A. Makarov, ed. by V. I. Krasovskiĭ and Ia. L. Al'pert, with title **Verkhnaia atmosfera.** Issued: Moscow, Izdat. Inostrannoĭ Literatury, **1955.** 639 p. 302 figs., 37 tables, bibliog. p. 590–609, eqs. **DLC** (QC879.M497). Review on English 2d. ed. in *Royal Meteorological Society, Quarterly Journal,* 79(342):571–572, Oct. **1953.** Review on Russian transl. by A. Kh. Khrgian in *Meteorologiia i Gidrologiia,* Leningrad, No. 10:64–67, Oct. **1956.** (For abstract on first English ed., *see* 1–57; 2d ed., *see* 4.8–15; Russian transl: *see* 9.7–17, *MAB.*)—The first edition of this valuable work, published in 1947 (*see* 1–57, Jan. 1950, *MAB*), contained 616 pages. About 100 pages of new material have been added, including the results of the latest research in almost every field covered by the 13 chapters. These additions include work on escape of atmospheric gases (Ch. I), atmospheric tides (Ch. II), radar studies of meteors (Ch. III), variations in ozone content with latitude and air masses (Ch. IV), dissociation of N_2 (Ch. V), ionospheric sounding by radio waves, estimation of recombination coefficients, tides and traveling disturbances in the ionosphere (Ch. VI), Sq and L variations near the geomagnetic equator (Ch. VII), up-to-date bands and lines in auroral spectrum (Ch. VIII), new theories of magnetic storms and aurora by Alfvén and Martyn (extension of Chapman-Ferraro theory) (Ch. IX), Russian work on zodiacal light and afterglow or airglow, height measurements of luminescent layers, hydrogen and sodium in the upper atmosphere, etc. (Ch. X), revised model of temperature distribution in upper atmosphere (Gerson) (Ch. XI), a new chapter on rocket exploration of upper atmosphere (V-2 and Aerobee flights) (Ch. XII), and new unsolved problems of the upper atmosphere, including a brief discussion of winds at high levels from indirect methods (Ch. XIII). No attempt at listing all of the important subjects covered in this work would do justice to its comprehensiveness. The amount of carefully prepared illustrative material (charts, graphs, tables, schematic diagrams, etc.), both borrowed and original, is amazing. In most cases the sources are carefully cited and a class bibliography of nearly 1000 references is a further aid in locating source material on all fields of upper air research by physical methods. *Subject Headings:* **1. Upper atmosphere physics textbooks 2. Atmospheric physics. I. Rozenberg, G. V.** (*transl.*) **II. Makarov, E. A.** (*transl.*).—*M.R.*

11A–14 551.509(02) 551.589

*†Petterssen, Sverre (*Prof. Met., Chic. Univ.*), **Weather analysis and forecasting.** 2d ed. N. Y., McGraw-Hill, **1956.** 2 vol. **Vol. 1, Motion and motion systems.** 428 p. **Vol. 2, Weather and**

weather systems. 266 p. numerous figs., tables, eqs. and refs. at end of each ch. 7 plates (fold.) in pocket of Vol. 2. **DWB, DLC** (QC995.P52). Review by Jerome Spar in *Science*, 124(3225):728, 29, Oct. 19, 1956.—The first volume of the second edition (a complete revision) of PETTERSSEN's textbook on synoptic analysis and forecasting covers in 19 chapters the theory and some applications of equations of motion (and derived equations) to analysis of pressure, temperature and wind fields and to numerical prediction. The chapters of Vol. 1 treat: 1) the basic equations of motion; 2) kinematics of quasi-horizontal motion (streamlines, trajectories, wind field); 3) kinematics of pressure fields; 4) wind in relation to pressure (gradient and geostrophic winds); 5) friction; 6) vertical structure of wind—the jet stream and ionospheric winds; 7) circulation and vorticity; 8) long wave theory; 9) shear and easterly waves; 10) computation of movement of waves and pressure systems; 11) fronts and frontogenesis; 12) structure of cyclones and anticyclones; 13) behavior of cyclones and anticyclones in various parts of the earth—blocking; 14) vertical velocity and divergence; 15) instability theory of cyclogenesis; 16) development theory; 17) synoptic examples of major storms, secondaries and hurricanes; 18) numerical forecasting; and 19) graphical integrations. Vol. II (Chs. 20–28) covers the more direct applications to forecasting: 20) sources of energy and transformation of air masses; 21) thermodynamical relations; 22) cloud and precipitation physics; 23) quantitative precipitation forecasting; 24) fog and stratus; 25) convective clouds and weather; 26) weather systems; 27) local forecast studies; and 28) synoptic climatology used in weather prediction. Ch. 20 borrows heavily from charts of W. C. JACOBS (1951) on energy exchange between ocean and atmosphere; Ch. 26 from BERGERON'S recent attempts to make weather charts more representative of weather conditions than of mathematically unrealistic models of pressure systems; Ch. 27 from GRINGORTEN'S (and others) ideas of objective aids to forecasting, and Ch. 28 (by TOM MALONE) from the ideas of synoptic dynamic-statistical climatology of JACOBS, WADSWORTH, MALONE and others. Finally, Ch. 23 (by J. C. THOMPSON) goes into the numerical prediction of precipitation from vertical motion data derived from upper air soundings. This volume taken by itself is a contribution to the textbook literature on practical analyses and forecasting. Taken together with the first volume (which is twice as big) it is a formidable tool for the teacher, student, or analyst. (*See* 7.8–4 for Vol. I and 8.4–7 for Vol. II.) *Subject Headings:* **1. Analysis and forecasting textbooks 2. Objective forecasting 3. Numerical rainfall forecasting 4. Synoptic climatology 5. Synoptic-dynamic analysis. I. Jacobs, W. C. II. Thompson, J. C. III. Malone, T. F.**—*M.R.*

11A–15 532.5(02) 551.511.6:551.551

†Kochin, N. E.; Kibel', I. A. and Roze, N. V., **Teoreticheskaia gidromekhanika.** [Theoretical hydromechanics.] Rev. 4th ed., ed. by I. A. Kibel'. Leningrad, Gosud. Izdat. Tekhniko-Teoreticheskoĭ Literatury, **1948.** 2 vol. Vol. 1, 535 p. 179 figs., bibliog p. 527–530, numerous eqs.; Vol. 2, 612 p. 156 figs., bibliog. p. 605–607, numerous eqs. **DLC** (QA901.K5) (Note: LC describes Vol. 1 as of 4th ed. Vol. 2 as of 3d ed.). Vol. 1 of 5th ed., ed. by I. A. Kibel', issued Moscow, **1955.** 560 p. 183 figs., bibliog. p. 552–556, numerous eqs. **DLC** (QA901.K52)—The several parts of this voluminous and highly theoretical treatise (or collection of treatises) cover in the first volume: I. Kinematics of fluids (A. Deformation field, B. Equations of continuity, C. Kinematics of rectilinear and vortex motion); II. Basic equations of hydrodynamics of ideal fluids; III. Hydrostatics; IV. Simple cases of motion in ideal fluids; V. Eddy motion in ideal fluids (KOCHIN); VI. Simple problems of movement of bodies in ideal fluids; VII. Extension of problems of motion in an ideal fluid; VIII. Wave motions in an ideal fluid, including basic equations, simple waves, 3-dimensional waves and long waves (KOCHIN). The second volume covers: I. Theoretical basis of gas dynamics (KIBEL'); II. Movement of viscous fluids (KOCHIN); III. Elementary theory of turbulence (KIBEL'). The 5th edition of Vol. 1 contains about 25 more pages than the 4th (1948) edition. The most important additions are found in Ch. 8, **Wave motions in an ideal fluid,** where several paragraphs have been added to provide detailed solutions for general and special cases of wave motion in an ideal compressible baroclinic fluid over a mountain range of infinite length, and the case of an isothermal atmosphere with varying heights of tropopause, the case of standing waves, vorticity in relation to formation of ridges and troughs, centers of action, Rossby's theory, etc., all additions by I. KIBEL'. The 2 vol. German edition will be of great value to those who do not read Russian, although Vol. 1 does not contain the above changes introduced into the 5th edition. (*Same item as* 6.5–7, 9.11–7 and 9.11–8, *MAB.*) *Subject Headings:* **1. Theoretical hydrodynamics textbooks 2. Turbulence theories 3. Eddy motion.**—*M.R.*

11A–16 551.58(02) 551.584(02)

*†Alisov, Boris Pavlovich; Drozdov, O. A. and Rubinshteĭn, E. S., **Kurs klimatologii, Chast' 1-2.** [Course in climatology, Pt. 1–2.] Leningrad, Gidrometeoizdat, **1952. Pt. 1, Obshchaia klimatologiia.** [General climatology.] **Pt. 2, Metody klimatologicheskoĭ obrabotki nabliudeniĭ.** [Methods for climatological process of observations.] 487 p. (both parts paged continuously). 162 figs., 6 charts (fold. at end), 134 tables, 135 refs. Also: Alisov, B. P.; Berlin, I. A. and Mikhel, V. M.,

Chast' 3, Klimaty zemnogo shara. [Pt. 3, Climates of the earth.] issued **1954.** 320 p. (Collation continued from Pt. 1–2) figs. 163–232, charts 7–16 (laid in pocket), tables 135–281, 90 refs. Pt. 1–3 **DWB** (M8 A414Ku), **DLC** (QC981.A483). Transl. of Pt. 1–2 into German with title **Lehrbuch der Klimatologie.** Issued Berlin, Deutscher Verlag der Wissenschaften, **1956.** 535 p. 160 figs., 6 plates (fold.), numerous tables, 137 refs. Reviews of the German translation by C. E. P. Brooks in *R.M.S., Q.J.*, 38(356):282, April **1957**; by H. E. Landsberg in *A.M.S., Bull.*, 38(8):498–500, Oct. **1957**; by F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 8(3/4):442–444, **1958.**—These two volumes comprise the best advanced course in climatology from all points of view to appear in the past decade. The point of view is that of a critical and well trained statistical and dynamic meteorologist with minor emphasis on the general geography or classification approach, and only a slight bias toward the Russian contributions, in Ch. I which deals with the history of climatology, followed by an excellent treatment of solar radiation and its effect on the heat balance, etc. Ch. II deals with the influence of the oceans and continents on climate and life; Ch. III with the effect of general and local circulation factors on climate (including air mass, frontal and synoptic climatology); Ch. IV devotes a few pages to climatic zones and types; Ch. V, influences of relief on climate; VI, microclimate; VII, climatic change; VIII, artificial changing of climate; IX, smoothing and homogenizing records; X, compiling data summaries for specific elements; XI, analyzing and synthesizing microclimatic, heat balance, ship, aerological and synoptic data. The second volume goes on to discuss: XII, major influences in climates of U.S.S.R.; XIII, climate of the rest of Europe; XIV, Asia (except U.S.S.R.); XV, Africa; XVI, Indonesia and Australia; XVII, North and Central America; XVIII, South America; XIX, Arctic and Antarctic; XX, Atlantic, Pacific and Indian Oceans; XXI, climate of free atmosphere (general and regional). Appended is a good bibliography, original charts of radiation and radiation balance, pressure, wind frequency, temperature anomalies, and cloud cover. (*Same item as* 4.8–1, 6.11–5, 9.7–13, *MAB.*) *Subject Headings:* **1. Climatology textbooks 2. Microclimatology textbooks.**—*M.R.*

11A–17 551.509.3(02):016

†Scherhag, Richard, **Neue Methoden der Wetteranalyse und Wetterprognose.** [New methods of weather analysis and weather forecasting.] Berlin, Springer-Verlag, **1948.** 424 p. 213 figs., 43 tables, 897 refs. **DWB**—This elaborate edition represented the substance of over 15 years of intensive labor on the part of the author, before and during World War II and is systematically arranged, taking the reader through the entire process of map analysis and forecasting, from the preparation of surface and upper air synoptic charts, through the techniques of compiling isallobaric and thickness charts, to the drawing and interpreting of the prognostic charts and the final preparation, issuance and even the verification of general or special, short, medium or long range forecasts. In addition there is an introductory section on the historical development of synoptic meteorology describing the various thermodynamic and aerological charts in use at the time or in the past, and another section on the general circulation and its effect on the weather, wherein is expounded at some length the Scherhag theory of stratospheric compensation (normal compensation and anomalous compensation) which was used by the author in compiling charts of baric topography for the 500, 225, 96 and 47 mb pressure surfaces. Sec. III concerns weather analysis, with well illustrated sections on the dynamic high, the cold high, principal air masses, frontal zones, cyclones, hurricanes, cold air sinks and stratospheric movements, followed by examples of the various types of air flow and peculiar synoptic situations over Europe. The stupendous bibliography contains 897 references, over 50 of which are works of the author. Very little material published after 1944 is included, although the book was completed in August 1948 and put on sale in January 1949. (*Same item as* 1–52, Jan. 1950, *MAB.*) *Subject Headings:* **1. Synoptic analysis 2. Prognostic charts 3. Weather forecasting textbooks.**—*M.R.*

11A–18 551.5:551.46(02)

†Shuleĭkin, Vasiliĭ Vladimirovich, **Fizika moria.** [Physics of the sea.] 3d ed. rev. Moscow, Akademiia Nauk SSSR, **1953.** 989 p. 615 figs. (some col., some fold.), foot-refs., numerous eqs. Fold. chart in pocket. **DLC** (QC11.S5 1953)—This monumental work contains nearly 50% more material than did the second edition (1941), which in itself was unique in its field. The present work is narrower in scope but more intensive than the equally comprehensive work of SVERDRUP (*see* 5A–32, Jan. 1954, *MAB*), covering less of the field of chemical, geological and biological oceanography, and more of the physical and meteorological aspects (though in this respect SVERDRUP'S book is not to be underestimated). The separate parts (each with 10–20 chapters) cover: 1) Dynamics of ocean currents, 2) Dynamics of tides and tidal "waves" (not "tidal waves"), 3) Dynamics of surface and internal waves (80 p.), 4) Thermal properties of the sea (100 p.) including exchange between sea and air, 5) Physical "causes" of climate and weather, 6) Optics of the sea, 7) Acoustics of the sea, 8) Molecular physics of the sea, 9) Biological physics of the sea and 10) Technical physics of the sea. Considerable attention is given to the author's ideas on marine and continental influences

on climate, climatic changes, atmospheric waves (theory of thermobaric waves or seiches in the atmosphere), singularities, etc. involving beautiful, colored charts. Some sections are highly theoretical—there being hardly a subject in the book on which the author has not made some original contribution since 1922, for instance **Drift of ice field** (1938–41), **Wave dynamics** (1924–54), **Thermics** (1926–29–31), **Optics** (1922). He also illustrates many instruments which he has invented. The author does not neglect references to the work of DEFANT, SVERDRUP, KRUMMEL, BJERKNES and ROSSBY, as well as to that of Russian authorities such as SHOKAL'SKIĬ, DOBROKLONSKIĬ, ZUBOV, etc. A few odd subjects such as the "sound of the sea" and the dynamics of fish have practical as well as theoretical interest, and are covered in detail. A good author and subject index is appended. There are over 125 references to the author's own work. (*Same item as* 6.2–2, Feb. 1955, *MAB.*) *Subject Headings:* **1. Physical oceanography textbooks 2. Marine meteorology.**—*M.R.*

11A–19 551.594.5(02)

*†Störmer, Carl. **The polar aurora.** Oxford, Clarendon Press, **1955.** 403 p. 213 figs. (incl. photos), numerous refs. throughout, tables, additional refs. p. 400–403, (*International Monographs on Radio*, ed. by Sir Edward Appleton and R. L. Smith-Rose). **DLC** (QC971.S77). Review in *Royal Met. Soc., Quarterly Journal*, 82(351):115, Jan. **1956.**—This is the first substantial textbook on the aurora to be published in the English language by the man who has become world famous for his life's work of photographing the aurora and studying its nature. The book could well have consisted entirely of the author's own findings which resulted mainly from over 50 years of study of parallactic photographs which he himself made by a method which he devised and many others have adopted. However, there is an abundance of reference to work of others in this field, as can be seen in the numerous foot-references and the added references to recent literature not cited in the text. The book is divided into two major parts which deal with: I. the descriptive aspects and II. the purely physical (atomic or molecular) and theoretical aspects. The 32 chapters cover, among other subjects: Pt. 1, 1) forms, 2) geographical description and periodicity, 3) methods of observation and photograph, 4) height determinations by visual and 5) by photographic methods, 6) measurements near the auroral belt and 7) outside the auroral belt, 8) measurements and observations in S. Norway 1911–52, 9) sunlit auroras, 10) intensity, 11) color, 12) auroral spectra, 13) spectra of sunlit aurora, 14) radio waves (10 cm) from aurora, 15) corpuscular currents outside atmosphere, 16) radio echoes from aurora, 17) Doppler studies of corpuscular stream, 18) absorption of corpuscular rays by atmosphere, 19) emission of corpuscular rays from sun. Pt. II, 1) differential equations, 2) results from study of differential equations, 3) families of orbits, 4) numerical integration, 5) intuitive method of control, 6) results of numerical integration (ALFVÉN'S method), 7) application of theory to laboratory experiments, 8) application of theory to polar aurora, 9) limitations of theory, 10) approach of theory to actual conditions, 11) other theories (CHAPMAN-FERRARO, MARTYN and ALFVÉN), 12) other applications, allowed and forbidden regions, solar, magnetic and coronal relations, etc. A good author and subject index and scores of excellent original photographs are included. This is a most satisfying book—one that has been awaited 25 years. (*Same item as* 7.4–6, April 1956, *MAB.*) *Subject Headings:* **1. Auroras 2. Auroral theories 3. Auroral photographs 4. Auroral bibliographies 5. Textbooks.**—*M.R.*

11A–20 551.5(02)

†Byers, Horace Robert (*Chicago Univ.*), **General meteorology.** 3rd ed. N. Y., McGraw-Hill, **1959.** 540 p. numerous figs., foot-refs., eqs. **DLC** (QC861.B9). Review in *Royal Meteorological Society, Quarterly Journal*, 86(367):123, Jan. **1960.** Review in *World Meteorological Organization, WMO Bulletin*, 8(4):222, Oct. **1959.** First ed. published **1937** with title, **Synoptic and aeronautical meteorology.** Second ed. with title, **General Meteorology,** pub. **1944.** (For abstracts on this latter ed., *see* D–49, 4B–330, 5H–23, 6F–25, *MAB.*)—Although this edition of BYERS' universally-known text for mature students of meteorology is no larger than the 1944 edition, all except the first two chapters have been completely rewritten and many new illustrations added to incorporate the vast body of new or more refined knowledge that has accrued since World War II. Although avoiding or even eliminating material on applied meteorology in order to stick to fundamentals, the author has maintained a nice balance between photographic, schematic, synoptic and theoretical (mathematical) presentation. The 21 highly condensed and well-illustrated chapters cover: 1) sun and earth; 2) radiation; 3) heat balance; 4) temperature distribution in atmosphere; 5) surface instruments and observations; 6) upper air observations; 7) thermodynamics and statics; 8) water vapor and thermodynamics; 9) winds; 10) vorticity and fluid flow; 11) general circulation; 12) cyclone and anticyclone structure; 13) life cycle of cyclones; 14) air masses; 15) synoptic analysis; 16) tropical meteorology; 17) objective and numerical forecasting; 18) cloud physics; 19) thunderstorms and squalls; 20) fog; and 21) turbulence. This is a handy and inexpensive textbook which everyone should have on his desk for reference. (*Same item as* 10.9–6, Sept. 1959, *MAB.*) *Subject Heading:* **1. Meteorology textbooks.**—*M.R.*

MAJOR SPECIALIZED REFERENCE WORKS

11A–21 551.5(09):92

Abbe, Truman, **Professor Abbe and the isobars: the story of Cleveland Abbe, America's first weatherman.** N. Y., Vantage Press, **1955.** 259 p. illus. (incl. photos and ports.). **DLC** (QC858.A2A6)—The present generation of meteorologists have all heard the name of CLEVELAND ABBE but are unaware of his tremendous scientific stature. He was an astronomer trained in the U. S. and at Pulkovo, Russia in the 1860's; director of the Cincinnati Observatory in 1869, where he made the first regular daily synoptic weather charts; professor of meteorology at the U. S. W. B. from 1870 (Signal Corps) until his death in 1916; editor of the **Monthly Weather Review** at the time of its greatest fame; editor of the **Bulletin of the Mount Weather Observatory** during its brief life; pioneer in many fields of theoretical and practical meteorology and climatology; writer of several classical textbooks and translations on dynamic and agricultural meteorology and instruments; bibliographer on an international scale; and known all over America as "Old Probs." The book covers his personal life, letters, diaries and his failures as well as successes. (*Same item as* 7.3–5, March 1956, *MAB.*) *Subject Headings:* **1. Biography of Cleveland Abbe 2. History of U. S. Weather Bureau 3. Abbe, Cleveland 4. U. S. Signal Corps.**—*M.R.*

11A–22 551.5(082)

†Academia Sinica, **Collected scientific papers, 1919–1949, Vol. 1, Meteorology.** (European language ed.) Peking, China, **1954.** 625 p. figs., tables, bibliog. throughout. (For listing of contents, *see* Vol. 7, No. 6, p. 791, June 1956, *MAB.*) **DLC** (Q111.A2)—An attractive volume, containing reprints of 25 (out of a possible 400) meteorological papers, published during the 30-year period by Chinese meteorologists, including 10 papers on synoptic meteorology of China, 7 on climatology, and 8 on dynamic meteorology and general circulation over the Far East. Each of the following authors contributed several papers: CHANG-WANG TU (4), CO-CHING CHU (2), A. LU (3), SJAN-ZSI LI (2), JEOU-JANG JAW (2), PAO-KUN CHANG (2) and 10 other authors, one each. Chinese articles have been translated into English, and articles originally in foreign languages have been translated into Chinese for the Chinese edition. The purpose of the collection is to emphasize the achievements of Chinese scientists of the last 30 years, and to encourage young scientists to make greater efforts in the future. This is the first of a series of such collections on natural science. The papers (3 of which are in German) are carefully selected and of high quality, theoretically, synoptically or statistically. The earliest papers were published in 1931, the most recent in 1949. The original sources were such well known periodicals as *Gerlands Beiträge*, *Journal of Meteorology*, *Meteorological Magazine* (Nanking) and *Memoirs of the National Research Institute of Meteorology* (Nanking). Subject matter ranges from typhoons, extratropical cyclones or cold waves of China, to long range forecasting of floods and droughts. (*Same item as* 7.11–1, Nov. 1956, *MAB.*) *Subject Headings:* **1. Collected works 2. Synoptic case histories 3. Climate of China 4. China. I. Chu, Co-Ching** (*ed.*).—*M.R.*

11A–23 551.5(08) 551.579(08)

*†Akademiia Nauk Uzbekskoĭ SSR. Institut Matematiki i Mekhaniki, **Meteorologiia i gidrologiia v Uzbekistane.** [Meteorology and hydrology in Uzbekistan.] Tashkent, **1955.** 326 p. figs., tables, refs., eqs. **DLC**—This volume contains articles by different authors on various aspects of the geophysics of Uzbekistan. The individual papers are arranged according to the following categories: Meteorology and climate; dynamic and synoptic meteorology; aerology; hydrology and terrestrial magnetism; atmospheric electricity and seismology. (For listing of contents, *see* p. 1558, Nov. 1957, *MAB.*) (*Same item as* 9.9–4, Sept. 1958, *MAB.*) *Subject Headings:* **1 Meteorology 2. Hydrology 3. Collected works 4. Uzbek S.S.R.**—*I.L.D.*

11A–24 551.582.3(569.4)

Ashbel, Dov (*Dir. Met. Lab. Hebrew Univ.*), **Bio-climatic atlas of Israel.** Jerusalem, Meteorological Dept. of the Hebrew University, **1950.** 151 p. 315 figs. In English and Hebrew. **DWB**—A comprehensive discussion of the climate and the individual meteorological variables of Israel supplemented by extensive diagrams, graphs and maps. The chapters cover barometric pressure, wind direction and speed, rain, dew, relative humidity and evaporation, solar radiation (includes radiation on horizontal surface, on walls at different hours, daily amount of radiation on walls, radiation on slopes, etc.), water and soil temperatures, air temperature, the Khamsin and temperature and humidity in the Middle East. The climate characteristics of particular areas and localities in Israel are discussed. All the discussion and data are oriented bioclimatically. (*Same item as* 4.6 1, June 1953, *MAB.*) *Subject Headings:* **1. Climatic atlases 2. Bioclimatology 3. Solar radiation 4. Climate of Israel 5. Israel.**—*I.L.D.*

11A–25 551.511.33:551.521 551.582.3(26)

Atlas teplovogo balansa. [Atlas of thermal balance.] Ed. by M. I. Budyko. Leningrad, 1955. 41 p. 41 cm×39 cm. Almost entirely charts (in color). At head of t-p.: Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby pri Sovete Ministrov Soiuza SSSR, Glavnaia Geofizicheskaia Observatoriia. **DWB.** Review by H. Flohn in *Erdkunde*, Bonn, 12(3):233–237, Sept. **1958.**—This work is a compilation of monthly and annual charts (in color) of A) total solar radiation, B) radiation balance of the earth's surface (continents and oceans), C) loss of heat by evaporation (oceans), D) turbulent heat exchange between sea and atmosphere, E) evaporation from oceans. An annual chart of heat lost or gained by ocean surface due to currents (advective heat exchange) is also included. An ample explanation or summary precedes each of the 6 major sections. The charts are nicely drawn in attractive colors and on a convenient world projection which allows data to be presented from 70°N to 63°S. Charts which embrace only the oceanic areas (i.e., evaporative heat loss and turbulent heat exchange) are supplemented by a page containing graphs of the annual regime of the element for 12 places on continents in different parts of the world. All heat or radiation charts use g cal/cm² year (or month), and evaporation in mm/year (or month). (*Same item as* 5–19, May 1957, *MAB.*) *Subject Headings:* **1. Heat balance atlases 2. Radiation balance charts 3. Evaporation from seas 4. Marine atlases 5. Radiation measurement accuracy. I. Leningrad. Glavnaia Geofizicheskaia Observatoriia. II. Budyko, M. I.** (*ed.*)—*M.R.*

11A–26 550.38(09) 550.38:92

†Balmer, Heinz, **Beiträge zur Geschichte der Erkenntnis des Erdmagnetismus.** [Contribution to the history of the knowledge of terrestrial magnetism.] Aarau, Verlag H. R. Sauerländer, **1956.** 292 p. 45 figs. (unnumbered), bibliographic refs. throughout. Bibliog. by sections, p. 583–659. Biographic section (with refs.), p. 663–866. (*Schweizerische Gesellschaft f. Geschichte der Medizin und der Naturwissenschaften, Veröffentlichung*, Vol. 22.) **DLC** (QC804.B3). Review in *Die Umschau*, 57(17):541, Sept. **1957.**—An exceedingly scholarly and voluminous treatise on all aspects of the history of geomagnetism with the biographies of all those contributing to our knowledge of the earth's magnetism, starting in Pt. I (p. 27–230) with the Chinese magnetic carriage (200 B.C.) and development of the ship's compass (ca. A.D. 300), going on to the discovery of magnets and the introduction of the compass into the West (Greece, Rome, France, the Arab countries, etc.) before the 13th century; its use by MARCO POLO and others from the Mediterranean; the discovery of the variations in the compass (COLUMBUS, Spanish, Portuguese and German developments); the history of the mariner's compass; observations and charts of the magnetic deviations and the calculation of the inclination and declination of the magnetic poles; WILLIAM GILBERT's work and the differentiation of electricity and magnetism; discoveries of the temporal changes in declination, EDMOND HALLEY; inclination determinations and the magnetic equator and pole; intensity of geomagnetic field, terminology and diurnal variations. Pt. II (p. 231–520) gives extensive quotations and biographical material on 18 of the chief contributors to geomagnetism: LUCRETIUS, PLINY, PETRUS PEREGRINUS, RHETICUS, HARTMANN, PEDRO DE MEDINA, MERCATOR, NORMAN, STEVIN, GILBERT, KEPLER, GALILEI, FOURNIER, HALLEY, HUMBOLDT and others. Pt. III (p. 521–579) takes up: (1) the legends of the Magnetic Mountain from PLINY to **Gulliver's Travels,** (2) the precursor of the magnetic telegraph about the time of GALILEI, and (3) the work on geomagnetism in Switzerland (1500–1700 and 1700–1850), and a list of sources and quotations (p. 581–659). Finally, there is a very complete biographic register (p. 661–866) of scores of contributors on the subject from earliest times and an author and title index, a list of translations from Latin, French and English, and a list of illustrations in chronological and in subject order. (*Same item as* 10.10–19, Oct. 1959, *MAB.*) *Subject Headings:* **1. History of geomagnetism 2. Geomagnetism 3. Biographies of geomagneticians 4. Compasses 5. Magnetic poles.** —*M.R.*

11A–27 551.506.22:550.3(08)

†Bates, D. R. (*ed.*), **The earth and its atmosphere.** N. Y., Basic Books, Inc., **1957.** 324 p. figs., photos, tables, bibliog. p. 303–308. **DLC** (QC806.B34)—The 17 chapters in this up-to-date collection of articles contain discussions by experts in the several fields of: 1) The IGY (S. CHAPMAN); 2) Origin and age of earth (KUIPER); 3) Earth's core (K. E. BULLEN); 4) Crust (J. T. WILSON), 5) Oceans (DEACON); 6) Magnetism (VESTINE); 7) Composition and structure of atmosphere (D. R. BATES); 8) Climate (EADY); 9) General circulation of atmosphere and oceans (EADY); 10) Ice ages (ÖPIK); 11) Meteorology (B. J. MASON); 12) Ionosphere (RATCLIFFE); 13) Airglow (BATES); 14) Aurorae and magnetic storms (FERRARO); 15) Meteors (LOVELL); 16) Cosmic radiation (J. G. WILSON); 17) Genesis of life (HALDANE). Numerous illustrative graphs and schematic diagrams and tables are included. The information, while not presented in a technical style, is substantial enough to satisfy anyone who is not an authority on the given subject. (For listing of contents, see Pt. III, p. 636, May 1958, *MAB*; articles abstracted separately.) (*Same item as* 9.5-2, May 1958.) *Subject Headings:* **1. Geophysics 2. International Geophysical Year, 1957 1958.**—*M.R.*

11A–28 551.507.362:629.19:551.501.7(02)

†Bates, David Robert (*ed.*), **Space research and exploration.** (rev. enl. ed.) N. Y., William Sloane, **1958.** 287 p. 21 figs., 21 tables, bibliogs., eqs. **DWB** (629.1388 B329sp). An earlier 1957 ed, ed. by D. R. Bates and Patrick Moore, issued London, Eyre and Spottiswoode, **1957,** 224 p. 24 figs., 26 tables, refs. at end of each ch., eqs. (*See* 9.1–2, Jan. 1958, *MAB.*) **DLC** (TL790.B3 1957)—A series of articles on rockets, space flight, cosmic ray and meteor hazards outside the atmosphere, earth satellites, manned satellites, space navigation, medical and biological problems, and conditions on the moon and planets. Each article is written by a British expert in the field; D. R. Bates, Patrick Moore, A. C. Clarke, L. R. Shepherd, M. W. Ovenden, H. S. W. Massey and others. Articles are somewhat technical in nature, and are supplemented by charts, tables, drawings and reference lists. (*Same item as* 10.6–4, June 1959, *MAB.*) *Subject Heading:* **1. Space flight textbooks.**—*M.R.*

11A–29 551.509.33(02)

*§†Baur, Franz, **Physikalisch-statistische Regeln als Grundlagen für Wetter- und Witterungsvorhersagen.** [Physical-statistical rules as bases for forecasts of weather and weather character. **Vol. 1,** pub. Frankfurt a.M., Akademische Verlagsgesellschaft MBH, **1956.** 138 p. 30 figs., 75 tables, bibliogs. (65 refs.), eqs. **Vol. 2,** pub. **1958.** 152 p. 23 figs., 60 tables, bibliogs. Foreword, table of contents, headings in text in German and English in both vols. Parts of Ch. 6 and 10 of Vol. 2 accompanied by English transl. **DWB** (M09.3 B351p). Reviews of Vol. 1 as follows: By J. M. Craddock in *Royal Meteorological Society, Quarterly Journal,* 83(355):136–137, Jan. **1957;** F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A.,* 9(4):529–531, **1957;** H. Trenkle in *Die Umschau,* Frankfurt a.M., 57(13):414, July 1, **1957.** Review of Vol. 2 by M. Teich in *Zeitschrift f. Meteorologie,* Berlin, 12(9/10):313–314, Sept./Oct. **1958.**—The first of these two volumes on medium and long range forecasting presents in textbook form the basic principles worked out over the last 35 years by the world-famous author and his "school." The connection between solar activity and Grosswetter is treated statistically in great detail and with a critical evaluation and practical hints, plus useful tables and correlographs. Vol. II gives rules for monthly and seasonal forecasts based on terrestrial observations, seasonal changes, singularities in circulation types in Europe, the Atlantic and Eastern North America. (*Same item as* 8.11–2, Nov. 1957, and 10.7–3, July 1959, *MAB.*) *Subject Headings:* **1. Long range forecasting textbooks 2. Statistical bases for forecasting 3. General circulation studies 4. Grosswetter 5. Singularities.**—*M.R.*

11A–30 52(08)

*†Beer, Arthur (*ed.*), **Vistas in astronomy.** London, Pergamon Press, **1955.** 2 vol. (Vol. 1, 776 p; Vol. 2, p. 779–1770). figs., tables, refs., bibliogs., eqs. Indexes in Vol. 2. (Special Supplements No. 3 and 4, to the *Journal of Atmospheric and Terrestrial Physics.*) (For listing of contents of pertinent articles, *see* Pt. III, p. 1458, Nov. 1958, *MAB.* These articles abstracted separately.) **DLC** (QB3.B35), **DWB** (520.82 B415v). Review by H. H. Voigt in *Die Naturwissenschaften,* Berlin, 45(17):427, Sept. 1, **1958.** Review by B. Vorontsov-Vel'iaminov in *Astronomicheskii Zhurnal,* Moscow, 35 (3):496–498, May/June **1958.**—Vol. I of this series of "compendiums" on astronomy and astrophysics included 7 sections: organization, history, dynamics, theory, instruments, radio astronomy and solar physics. The second volume includes sections 8–16 (including 100 articles by authorities) on solar-terrestrial relations, geophysics, planetary systems, stellar astronomy, photometry, spectroscopy, novae, galaxies, and lastly, cosmogony and cosmology. The section on solar-terrestrial relations (p. 779–826) contains 6 articles on the ionosphere (Sir Edward Appleton), absorption of radio waves in the ionosphere (J. A. Ratcliffe), solar flares (M. A. Ellison), M-regions and solar activity (M. Waldmeier), the corpuscular radiation of the sun (M. J. Smyth), and solar cosmic rays (P. M. S. Blackett). In the section on geophysics there are articles on: thunderstorm (E. T. Pierce), atmospheric CO_2 (Leo Goldberg), infrared spectrum of atmosphere (T. W. Wormell), the O_3 layer and the 9.6μ O_3 band (R. M. Goody and C. D. Walshaw), O_3 near the North Pole (A. E. Douglas et al.), upper atmosphere rocket soundings (S. F. Singer), geomagnetic storms and bays (Sydney Chapman), and the airglow (Daniel Barbier). In the section on the planetary system, Luigi G. Jacchia and F. L. Whipple have an article on the Harvard photographic meteor program. Miroslav Plavec has one on the evolution of meteor streams, and H. C. Van de Hulst has one on the zodiacal light. Finally, in the last section (16), F. A. Paneth has an article on the frequency of meteoritic falls through the ages, and Harold C. Urey one on the origin and properties of the moon's surface. Each article is abstracted separately and will be run in later issues of *MAB.* Extensive bibliographies accompany many of the articles, and illustrative material in the form of diagrams, photographs and tables are interspersed throughout the text. (*Same item as* 10.10–6, Oct. 1959, *MAB.*) *Subject Headings:* **1. Astronomy 2. Astrophysics**—*M.R.*

11A–31 551.508.41(09)

Bell, Geoffrey Howard and Bell, E. F., **Old English barometers.** Winchester, England, Warren, 1952. 42 p. 40 plates, refs. p. 40. **DLC** (QC886.B38)—Over 40 early barometers are shown on glossy plates, and their origin described in the text according to the various types in vogue in the 17th and 18th centuries in England. These are: cistern, siphon, portable, diagonal, wheel, double and marine barometers. The mercury barometer, especially the "wheel" type (which later was adapted to the aneroid barometer that is now prevalent), together with elaborate decorations, fancy cases or stands, and accessories such as thermometers, hydrometers, levels, clocks and calendars, as well as weather indicators, became popular as home or palace decorations. The history of invention or development of each type is set forth, with literary references, and notes on the manufacture, etc. BOYLE, HOOKE and TORRICELLI are among the important scientists who figure in the development of the barometer. (*Same item as* 6.8–54, Aug. 1955, *MAB.*) *Subject Headings:* **1. Barometers 2. History of barometry 3. English barometers.**—*M.R.*

11A–32 551.5(02)

*†Berry, Frederick A.; Bollay, E. and Beers, Norman R., **Handbook of meteorology.** New York, McGraw-Hill, **1945.** 1068 p. numerous figs. and tables, bibliog. **DWB**—A comprehensive reference book for meteorologists. Sec. I. **Numerical and graphical data,** by N. R. Beers, p. 1–121, includes mathematical tables, units and their conversion, physical constants, nomograms for gradient wind, rates of ascent of balloons, thermal properties of water, potential temperature, lapse rates, density of air and water vapor, barometer and altimeter corrections, U. S. Standard atmosphere, dynamic meters, etc. Sec. II. **Meteorological mathematics and calculations,** by F. A. Ficken, p. 123–240, deals with constants, variables, functions; methods of computation, including construction of nomograms; elementary geometry, formal algebra, trigonometry, solution of equations, analytic geometry, differential calculus, integral calculus, etc., vector analysis, mechanics and empirical data including statistical methods. This section is only incidentally meteorological. The remaining sections are more definitely meteorological. III. **Physics of atmospheric phenomena;** IV. **Radiation,** by J. Charney (including Elsasser radiation chart); V. **Meteorological thermodynamics and atmospheric statics,** by N. R. Beers, with numerous constants and working charts of pseudo-adiabatic temperature diagram, tephigram, emagram, Refsdal aerogram, equivalent potential temperature diagram, etc.); Vi. **Kinematics and dynamics of fluid flow,** by H. J. Stewart (including atmospheric oscillations); VII. **The scientific basis of modern meteorology,** by C.-G. Rossby; VIII. **Meteorological instruments,** by L. E. Wood; IX. **Transmission and plotting of meteorological data,** by G. R. Jenkins; X. **Synoptic meteorology and weather forecasting,** (8 authors); XI. **Clouds and states of sky,** by P. L. Schereschewsky; XII. **Climatology,** by H. E. Landsberg; XIII. **Hydrometeorology,** by A. S. Fry and A. K. Showalter; and XIV. **Oceanography,** by H. U. Sverdrup. The handbook is still a standard reference work in spite of advances since the end of World War II. (*Same item as* D–50, April 1950 and 2D–22, April 1951, *MAB.*) *Subject Headings:* **1. Handbook of meteorology.**—*M.R.*

11A–33 551.5:551.46:92 551.513 551.509.312

†Bolin, Bert (*Univ. of Stockholm*), ed., **The atmosphere and the sea in motion: scientific contributions to the Rossby Memorial Volume.** N. Y., Rockefeller Institute Press, in association with Oxford Univ. Press, **1959.** 509 p. figs., tables, refs., eqs. throughout. Includes port. and 2 biographical sketches of Rossby. Publications by Carl-Gustaf Rossby, p. 60–64. (For listing of contents, *see* Pt. III, p. 148, Jan. 1960, *MAB.* These articles abstracted separately.) **DLC**—An elegant volume comprising 36 papers on scientific subjects on the general circulation, numerical weather forecasting, ocean currents and exchange between the sea and atmosphere, and 2 articles on ROSSBY's life and works plus a bibliography of his works, all written by colleagues or students who held him in great esteem. All of the articles except three are in English (one is in French and two in German). Some of the better known authors are: J. BJERKNES, B. HAURWITZ, H. STOMMEL, W. H. MUNK, H. WEXLER, R. B. MONTGOMERY, M. NEIBURGER, L. D. KAPLAN, J. CHARNY, R. FJØRTOFT, E. PALMEN, O. QUENEY, J. VAN MIEGHEM, J. NAMIAS, A. ELIASSEN, F. DEFANT, H. RIEHL, N. A. PHILLIPS, J. HOLMBOE, R. R. LONG, H. L. KUO, G. P. CRESSMAN, K. HINKELMANN, J. S. MALKUS, P. D. THOMPSON, T. C. YEH, C. L. PEKERIS, and others. At the beginning is a translation of a long and thorough survey paper by ROSSBY on **Current problems in meteorology,** originally published by the Swedish National Science Research Council (in Swedish) in 1956. The papers were originally to have been prepared for a 60th anniversary volume, but ROSSBY died only a month after the invitations went out. Biographical sketches by BERGERON and BYERS go into his early life in Sweden and into his fruitful career as an organizer in America, respectively. Editing of the volume was in the hands of BOLIN, CHARNEY, ELIASSEN, PLATZMAN and STOMMEL. Most of the articles are highly theoretical, testifying to the influence this dynamic personality had on his many outstanding followers. (*Same item as* 11.1–1, Jan. 1960, *MAB.*) *Subject Headings:* **1. Rossby Memorial Volume 2. Biography of C. G. Rossby 3. Ocean currents 4. General circulation**

5. Numerical forecasting. I. Charney, Jule G. II. Eliassen, Arnt III. Platzman, George W. IV. Stommel, Henry.—*M.R.*

11A–34 551.582.3(81)

Brazil. Conselho Nacional de Geografia [and] Brazil. Serviço de Meteorologia, **Atlas climatológico do Brasil** [Climatological atlas of Brazil], comp. by Adalberto B. Serra. Rio de Janeiro, **1955–1956.** 2 vol. Vol. 1 (in 2 Pts.), issued **1955, Medias, extremos, totais** [Means, extremes, totals]. 221 charts. Vol. 2, issued **1956, Frequencias-fenômenos** [Frequencies of phenomena]. Charts 222–433. 37×36 cm. **DWB, DLC** (G1776.C8S4 MAP)—The first volume (in two parts) consists of 221 charts of mean, extreme and total temperature, precipitation, sunshine, evaporation, wind direction and speed, cloudiness, relative humidity, pressure and vapor pressure, based on records from 371 stations with periods of record up to 32 yrs. For each element there are 13 charts (one for each month and one for the year). The base map is on a scale of 1:15,000,000 and shows the essential topography. Lines are neatly and sensibly drawn in consideration of the scale used, and the density of the network. Inset charts show greater detail for the São Paulo and Rio de Janeiro areas (on a 1:7.5 million and a 1:2.5 million scale, respectively). Of course little detail is possible for the wide area of the Amazon Basin. The second volume contains 212 maps of frequencies of various phenomena based on normals from 371 stations with periods of record up to 32 yrs. For each element there are 13 charts (12 monthly and 1 annual). The elements are: wind roses (direction to 8 pts.), calms, days with rain of >0.1 mm, >1.0 mm and >10 mm, days with fog, thunderstorms, haze, dew, winds of gale force, clear days, cloudy days, hot days (>25°C), warm nights (minimum >20°C), freezing (<0°) and ice days. Charts are nicely drawn and the volume is well bound. However, the legends on the rainday charts are confusing. (*Same items as* 7.7–9, July 1956, and 8.9–14, Sept. 1957, *MAB.*) *Subject Headings:* **1. Climatic atlases 2. Climate of Brazil 3. Brazil. I. Serra, Adalberto B.**—*M.R.*

11A–35 551.5(030.8)

Brazol, Demetrio, **Dictionary of meteorological and related terms, Part I, English-Spanish. Part II, Spanish-English.** 1st ed. Buenos Aires, Libreria Hachette, **1955.** 557 p. **DWB.** Review by J. M. Rubiato and O. M. Ashford in *World Meteorological Organization, WMO Bulletin*, 5(3):122, July **1956.**—Meteorological terms and phrases are arranged in groupings corresponding to the main divisions of the Universal Decimal System for meteorology. The coverage is remarkably thorough, as evidenced, for example, by the inclusion of numerous semicolloquial expressions used in synoptic and air mass analysis not found in American and British glossaries. The meteorological section is followed by a generous sampling of terms in related fields such as oceanography, astronomy and telecommunications. Many statistical terms are included. The appendices contain conversion tables for metric and English units, as well as a glossary of selected terms, with detailed definitions and/or historical and etymological notes (in Spanish only). (*Same item as* 8.9–16, Sept. 1957, *MAB.*) *Subject Headings:* **1. Meteorological glossaries 2. English-Spanish glossaries 3. Spanish-English glossaries.**—*R. S. Quiroz.*

11A–36 551.557.36 551.587 551.501.77

*†Brooks, C. E. P.; Durst, Charles S.; Carruthers, Nellie et al., **Upper winds over the world.** *Great Britain. Meteorological Office, Geophysical Memoirs*, No. 85, **1950.** 149 p. 19 figs., 60 charts, 33 tables, 74 classified references to upper air data. **DWB**—Probably the most widely used paper-covered monograph in the field of meteorology. It describes a method of constructing roses of wind speed and direction for any place at any height up to 40,000 ft. It is assumed that the distribution of winds in the free air approximates a circular normal distribution about the vector mean wind. Hence, a wind rose can be constructed if vector mean and vector standard deviation are known. Outside the tropics, the vector mean can be found from the spacing of lines of equal height of isobaric surfaces. Pt. II gives world charts of mean heights of 700, 500, 300, 200 and 130 mb surfaces for four seasons, with an account of method of construction. Pt. III gives charts of standard vector deviation for same levels and seasons. Between 25°N and 25°S the geostrophic relation does not hold and for these regions seasonal charts of stream lines and mean vector speed are given. Appendices describe use of pilot balloon observations in construction of wind roses and give tables for constructing roses from vector mean and standard deviation. (*Same item as* 10–117, Oct. 1950, *MAB.*) *Subject Headings:* **1. Upper air winds 2. Wind roses 3. Upper air observations. I. Dewar, D. II. Sawyer, J.**—*M.R.*

11A–37 551.582.2(497.2) 551.578.46(497.2)

Bulgaria. Khidrometeorologichna Sluzhba, [**Collection of articles on the climate of Bulgaria,** ed. by L. Krŭstanov.] Its *Trudove* [Publications], Vol. 4, issued Sofia, **1955.** 553 p. figs., charts in pocket (colored), tables. A collection of articles by D. Angelov, D. Blŭskova, R. N. Kalcheva, E. Khershkovich, K. T. Kirov, M. Kiuchukova, L. Krŭstanov, St. Lingova, M. Stanev, B. Staneva,

nd L. Sŭbev. **DLC** (QC851.B922)—This large volume (in an edition of 480 copies) contains a collection of 13 statistical climatological papers on the annual and regional variations in pressure, wind, temperature, frost, absolute humidity, snow cover, cloudiness, sunshine, cloud-sunshine correlation, thunderstorms, and complex climatology of Bulgaria. At least 20 or 30 yrs of records are used, from scores of stations wherever possible, and the original data included in extensive tables as well as in illustrative tables and graphs, maps, wind roses, statistical curves, etc. The two articles on snow cover in Bulgaria, one by B. Staneva (p. 213-270) and one by E. Khershkovich (p. 271–327), are especially comprehensive, taking up not only the first and last dates of snow cover, but also the days of continuous snow cover, frequency of months without snow cover, the mean, mean maximum and absolute maximum depth of snow, number of days and depth of snow by decades, water content of snow, frequency of duration of snow cover by decades, frequency of snow depth by decades, and snowfall, wind roses (on chart), effect of height above sea level on snow cover, beginning and ending and on depth (0–2500 m elev.), relation between mean monthly temperature and snow cover (the latter on scatter diagrams), etc. (*Same item as* 10.4–1, April 1959, *MAB*.) (*Subject Headings:* **1. Climate of Bulgaria 2. Snow cover in Bulgaria 3. Bulgaria. I. Angelov, D. II. Blŭskova, D. III. Kalcheva, R. N. IV. Khershkovich, E. V. Kirov, K. T. VI. Kiuchukova, M. VII. Krŭstanov, L. VIII. Lingova, St. IX. Stanev, M. X. Staneva, B. XI. Sŭbev, L.**

11A–38 551.515.4:629.13(02)

*†§Byers, Horace R. and Braham, Roscoe R., Jr., **The thunderstorm: report of the Thunderstorm Project.** (A joint project of four U. S. Government Agencies: Air Force, Navy, National Advisory Committee for Aeronautics, and Weather Bureau.) Washington, D. C., U. S. Gov. Print. Off., June **1949.** 287 p. 254 figs., 49 tables, 63 refs., append. **DWB, DLC**—The final and most comprehensive of the score of reports issued by Byers and his collaborators on various phases of the Thunderstorm Project. In the preface mention is made of over 80 professional meteorologists and technicians who have in one way or another been associated with this Project and report. A history of the Project, since it was first conceived (in 1943) and begun (in August 1945), is followed by a discussion of the design of the observational program and the areas of observation (Orlando, Florida in 1946, and Wilmington, Ohio in 1947). Details of the topography, climatology and micrometeorological networks in the above regions are given in photographs, tables and charts. The body of the report is divided into three parts: I (Ch. I to VIII), a description of the structure, wind fields, electrical fields, turbulence and precipitation of thunderstorms. II (Ch. IX and X), Effect of thunderstorms on flight of aircraft and on ground operations. III, Detailed case histories of five thunderstorm situations plus several squall-line situations. An appendix describes and illustrates surface, upper air, radar and airplane instruments and photographic equipment. A useful bibliography and index are also included. A wealth of original data charts and diagrams showing gust velocities, rainfall intensities, rate of growth of cumuli, temperature differences inside clouds, pressure, humidity, wind and temperature changes, electrical fields, cloud coverage, etc. is included. A large number of PPI-Scope (radar) photographs gives the work added detail and value heretofore impossible in works of this kind. The whole report is logically arranged and well balanced, yet leaves the impression that only a small portion of the value has been extracted from the vast amount of observational material accumulated by this Project. (*Same item as* 6–46, June 1950, *MAB*.) (*Subject Headings:* **1. Thunderstorms 2. Thunderstorm Project 3. Aeronautical meteorology textbooks.**—*M.R.*

11A–39 551.594.21:061.3

***†Thunderstorm electricity,** ed. by Horace R. Byers. Chicago, Univ. of Chicago Press, **1953.** 344 p. figs., tables, refs. at end of each chapter, eqs. Price: $6. **DLC, DWB**—This important "compendium" of knowledge of thunderstorm electricity and associated phenomena and applications is an outgrowth of the Conference on Thunderstorm Electricity which was held at Chicago on April 10–14, 1950 under the auspices of the U. S. Air Force, Geophysical Research Directorate. The Report of that Conference was published in Oct. 1950 (*see* 4.11–278, Nov. 1953, *MAB*) and individual articles have been abstracted separately (*see* Byers, 3.5–169; Weickmann, 4.1–167; Kuettner, 3.8–225; Gunn, 3.8–223; Wait, 4.10–261; Holzer, 4.4–117; Norinder, 3.8–226; Newman, 3.9–234; Harker, 3.5–280; Norinder, 3.5–282 and Newman, 4.5–230 in 1952 and 1953 issues of *MAB*). In addition to articles mentioned above, articles by Workman, Loeb, Chapman and Gish were presented. The present volume contains most of these papers, properly edited and in some cases revised and improved. In addition there is an excellent article by H. Israël on the atmospheric electric field and its meteorological causes (Ch. II); one by L. Koenigsfeld on atmospheric potential gradient (Ch. III); one by Malan and Schonland on charge distribution determined by lightning measurements (Ch. XI); field changes due to lightning discharges by Pierce and Wormell (Ch. XII); Norinder's article on long distance location of thunderstorms by sferics (Ch. XIV); and an introduction by Horace R. Byers (Ch. I). Other articles concern thunderstorm structure and dynamics, Byers and Braham (Ch. IV); thunderstorm electricity in relation to rain and snow

particle by CHAPMAN (Ch. IX); measurement of charges on precipitation particles by GUNN (Ch. VIII) and aircraft and lightning by NEWMAN (Ch. XV). This excellent collection of papers contains a great deal of experimental data and numerous references to the most important literature in each specialized field. The work is amply illustrated with line drawings and photographs of equipment. (*Same item as* 4.10–12, Oct. 1953, *MAB.*) *Subject Headings:* **1. Thunderstorm electricity. I. Byers, Horace R.** (*ed.*) **II. Conference on Thunderstorm Electricity, Univ. of Chicago, April 1950.**—*M.R.*

11A–40 551.583.3:016

†Charlesworth, John Kaye (*Queens Univ., Belfast*), **The Quaternary era with special reference to its glaciation.** London, Edward Arnold, **1957.** 2 vol. (1700 p.), 326 figs., tables, bibliog. at end of each chapter. Quaternary era bibliog. p. 1556–1601 (1924 titles). **DLC** (QE696.C53 1957)—This is the type of book that comes out only once in a decade in any given field. It represents a systematic survey of the pertinent facts or data contained in nearly 2000 articles from hundreds of sources. Among the 50-odd chapters are a number of purely meteorological or climatological aspects of the Quaternary period, including recent climatic changes and glacial advances or retreats. Other chapters discuss snow, ice, permafrost, sea level, volcanism, glaciation of the British Isles and of various localities, glacial lakes, geochronology of Quaternary, stratigraphy, plant, animal and human life, etc. Specifically Ch. 1) discusses snow, snowline and avalanches; 2) glacier structure, neve, firn; 3) ablation; 4) classification of glaciers; 5) ice motion and temperature; 6) meteorological periodicities, sunspots, glacier oscillations and their cause; 7) shelf ice; 8) drift ice; 9–15) erosion by glaciers; 16–25) deposition; 26) loess; 27) cryoturbation; 28) sea ice action; 29–31) Pleistocene meteorology and climatology; 32) world glaciation; 40) periglacial conditions; 41) pluvial belts; 49) postglacial climatic changes; 50) chronology; and 51) causes of glacial period. The formidable bibliography, detailed index and hundreds of reference citations at the end of each chapter make this an outstanding contribution to the bibliography of the subject. (*Same item as* **9.1–11**, Jan. 1958, *MAB.*) *Subject Headings:* **1. Quaternary glaciation 2. Climatic changes 3. Glacial climates 4. Pleistocene climatology 5. Bibliography on glacial climates.**—*M.R.*

11A–41 551.506.5 91.04(99)

Deutsche Antarktische Expedition, 1938/1939, **Wissenschaftliche Ergebnisse** [Scientific results], Vol. 2, issued Hamburg, Geographisch-Kartographische Anstalt "Mundus," **1954–1957/1958.** Vol. 2 in 2 Pts. Contents, Pt. 1 (pub. **1954**), Kosack, H. P.: **Die Neubearbeitung der Übersichtskarte des Arbeitsgebietes der Expedition** [New edition of the general map of the area covered by the Expedition], p. 1–15. Regula, Herbert: **Die Wetterverhältnisse während der Expedition und die Ergebnisse der meteorologischen Messungen** [Weather conditions during the Expedition and the results of meteorological measurements], p. 16–40. Pt. 2 (pub. **1957/1958**), Schumacher, Arnold: **Die Lotungen der "Schwabenland"** [The soundings of the "Schwabenland"], p. 41–60. Model, Fritz: **Ein Beitrag zur regionalen Ozeanographie der Weddellsee** [Contribution to the regional oceanography of the Weddell Sea], p. 63–96. Gburek, Leo: **Erdmagnetische Messungen, Eisuntersuchungen, Strahlungmessungen und Kernzählungen** [Geomagnetic measurements, ice investigations, radiation measurements and nuclei count], p. 97–100. **DWB** (919.9 D486w)—The first volume of this report (*see* 6.10–20, Oct. 1955, *MAB*) contained general information and cartographic material on the 1938/39 Antarctic expedition of the aircraft carrier "Schwabenland" under CAPTAINS A. KOTTAS and A. RITSCHER. The scientific results are contained in this second volume which was long delayed by wartime and post-war events. Among the data presented, the results of radiosonde ascents are of the greatest interest from a meteorological point of view. Other tables and charts include hydrographic, bathymetric and cartographic results. A major portion of the meteorological (and some of the other) records were destroyed during the war. Each section of the report is being abstracted separately. (*Same item as* 10.10–8, Oct. 1959, *MAB.*) *Subject Headings.* **1. German Antarctic Expedition, 1938/1939 2. Antarctic expeditions 3. Antarctica.**—*G.T.*

11A–42 551.515.3(02)

*†Flora, Snowden Dwight (*Retired, U. S. W. B., Topeka, Kan.*), **Tornadoes of the United States.** [rev. ed.] Norman, Okla., Univ. of Oklahoma Press, **1954.** 221 p. tables, figs., photos, refs. throughout. **DWB** (M15.3 F632t)—An authoritative and original text on one of the most dramatic of meteorological phenomena, written by a man who spent his life in Kansas, the state with the greatest number of reported tornadoes. The first (1953) edition (*see* 4.8–8, Aug. 1953, *MAB*) contained chapters on causes and structure of tornadoes, on the destructive forces, on forecasts and warnings, times and places of occurrence, safety precautions, freaks, notable disasters, hazard by states, waterspouts and other violent local storms in other countries. The second edition, published only a year later, contained much new data accrued during 1953 (descriptions and statistics of the San Angelo and Waco, Tex., Flint, Mich., Worcester, Mass., and the Cleveland, Ohio tornadoes of 1953), the worst tornado year of the generation, and a chapter on protection against tornado damage. The book contains much statistical, synoptic and meteorological information, excellent photos of

rnadoes and related events, and maps and graphs depicting the statistical or climatological distributions. (*Same item as* 6.3–2, March 1955, *MAB.*) *Subject Headings:* **1. Tornado textbooks 2. Tornado damage statistics 3. United States.**—*M.R.*

11A–43 551.578.7(73)

§*Flora, Snowden Dwight, **Hailstorms of the United States.** Norman, Univ. of Oklahoma Press, 1956. 201 p. 12 figs., numerous photos, 6 tables, numerous foot-refs. **DWB, DLC**—As in the case of his book on **Tornadoes of the United States** (*see* 4.8–8, Aug. 1953 and 6.3–2, March 1955, *MAB*), FLORA has taken a subject which is of immense importance in his home state of Kansas, and has examined every conceivable facet of the subject and come up with a readable, yet informative (and authoritative) book giving the meteorological, geographical, agricultural and economic facts and statistics for the benefit of the meteorologist or layman, student or farmer, teacher or insurance actuary. The 7 chapters are entitled: 1. Hail: the white plague; 2. Oddities of hail and hail damage; 3. When and why hailstorms occur; 4. Forecasting hail; 5. Insurance against hail damage; 6. Hail hazard by states; 7. Hailstorms in other countries. Tables show diurnal, seasonal and regional frequencies, damage and insurance data. Several maps of the U. S. show hail statistics by states or portions of states in a number of ways: hailstorm, hail damage, hail days, ratio of hail days to thunderstorm days, hail insurance rates, etc. A state by state summary of hailstorms and damage, including listing of the most costly occurrences and dates thereof, unusual types and occurrences of hail, increase of hail occurrence with altitude, etc., are included. The region of greatest hail occurrence is just east of the Continental Divide from Denver north into Wyoming and Montana. Greatest damage, of course, occurs farther east where crop values are higher. Incidentally, North Carolina is the only state east of the Mississippi where annual damage runs into the millions of dollars (largely due to vulnerability of tobacco plants). (*Same item as* 8.6–8, June 1957, *MAB.*) *Subject Headings:* **1. Hailstorms, U. S. 2. Hail damage statistics 3. Popular science books 4. United States.**—*M.R.*

11A–44 551.521 551.593.54

†Foitzik, Leonhard and Hinzpeter, Hans, **Sonnenstrahlung und Lufttrübung.** [Solar radiation and atmospheric turbidity.] Leipzig, Akademische Verlagsgesellschaft Geest & Portig, **1958.** 309 p. 80 figs. +8 figs. (in color), 364 refs. Price: DM 43 (*Probleme der Kosmischen Physik*, Vol. 31). **DLC** (QC911.F76). Review by O. Czepa in *Beiträge zur Geophysik*, Leipzig, 68(3):188–189, **1959.** Review by H. Koschmieder in *Beiträge zur Physik der Atmosphäre*, Frankfurt a.Main, 32(1/2):125–126, **1959.** Review by Wolfgang Collmann in *Annalen der Meteorologie*, Hamburg, 8(9/10):316–317, **1959.** Review by I. A. Khvostikov in *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 9:1438–1439, Sept. **1959.**—This substantial monographic treatise is an outgrowth of a work planned, before his death in 1943, by OTTO HOELPER, and developed further by F. LINKE who also died during World War II. The early plans, however, were not carried out so the present authors have prepared a completely new text on the basis of recent advances by the authors and their contemporaries (through 1956). Nine major chapters deal with: 1) solar radiation, its optical, thermal and spectral properties; 2) the atmosphere (composition, structure, ozone, water and aerosols); 3) absorption and extinction in gases, scattering, line and band absorption and absorption by N_2, O_2, O_3, CO_2, H_2O, etc.; 4) scattering by molecules of air, dust, etc.; 5) processes resulting from solar radiation penetration through the atmosphere; 6) actinometry and pyrheliometry; 7) the solar constant; 8) determination of turbidity from actinometric measurement and 9) determination of ozone, water vapor and dust by radiation measurement. An extensive bibliography of 364 references to literature in this field published from 1838 to 1957, and an author and subject index are appended. As is the case with all volumes of the famous **Probleme der Kosmischen Physik,** the quality of editing, binding, illustrative material, tabular and graphic data presentation and reference material is unequaled except in the case of **Advances in Geophysics.** And none of the "Advances" have quite the comprehensiveness of this excellent work. (*Same item as* 10.11–13, Nov. 1959, *MAB.*) *Subject Headings:* **1. Solar radiation 2. Turbidity.**—*M.R.*

11A–45 551.582.3(43)

*Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, **Klima-Atlas für das Gebiet der Deutschen Demokratischen Republik.** [Climatic atlas for the German Democratic Republic.] Berlin, Akademie-Verlag, **1953.** Each section repaged. Mostly maps (in color), graphs. 22″×17″. Also: . . . **Klima-Atlas für das Gebiet . . . Erläuterungen.** [Explanations] **1953.** 19 p. tables, 2 figs. **DWB**—This is the third and most easily handled climatic atlas to be issued for the various major zones of Germany (*see* 2C–177 and 2.11–159, March and Nov. 1951, *MAB*). The large many colored charts are arranged into 5 groups. Pt. I contains 6 general geographic charts (relief, geographic regions, soil, plants and climatic zones). Pt. II contains 48 standard climatic charts of mean data and frequencies for the year or for representative months for the entire period of record (wind frequencies, temperature, temperature range, hot, cold, frosty, frost free periods, vegetative period, mean cloudiness, precipitation for each month, season,

year and vegetation period, aridity index, hydro and thermal continentality, thunderstorm and fog days, etc.). Pt. III consists of 5 phenological charts, Pt. IV contains 6 charts giving examples of conditions during the cold Jan. (1940), the warm Jan. (1921), the wet Feb. (1950) and dry Feb. (1951), the number of days with snow cover in the year of little snow (1935–36) and the maximum depth during the snowy month of Dec. 1935. Pt. V presents in graphic form data on the departures of monthly mean temperature from the long term average (7 stations), the daily highest and lowest and mean temperature at Potsdam (1901–1950), the values of soil temperature to 100 cm depth in winter and summer for Potsdam, variations of precipitation in the year, distribution of monthly precipitation in the year, distribution of monthly precipitation totals for each month (1901–50) and annual totals for each year (1901–50) for a number of stations. Finally, the annotations for each chart are quite complete, both in the atlas itself and in the supplementary volume which is devoted entirely to explanations of the individual charts. Most of the charts are based on the period 1891–1930. For some stations the data are for 1851–1951. (*Same item as* 5.4–2, April 1954, *MAB.*) *Subject Headings:* **1. Climatic atlases 2. Climatic data 3. Climate of East Germany 4. East Germany. I. Philipps, H.** (*ed.*).—*M.R.*

11A–46 551.582(494) 551.5:551.43

*†Götz, Friedrich Wilhelm Paul (*Arosa, Switzerland*), **Klima und Wetter in Arosa nach fünfundfünfzigjährigen Aufzeichnungen seiner Meteorologischen Station.** [Climate and weather in Arosa according to 55 years of records at the Meteorological Station.] Frauenfeld, Huber, **1954.** 148 p., 65 figs. (incl. photos.), 64 tables, 127 refs. **DLC**—This is a beautifully printed and edited local climatology and the quality of the contents fully justifies the quality of the edition. The site of the station, temperature conditions, humidity (lack of), pureness of the atmosphere, wind and föhn, cloudiness, rain and snow, sunshine, radiation climate and climatic seasons and variations occupy separate chapters with complete and detailed coverage of each subject. Analytical tabular data, beautiful illustrations, charts and graphs, and a scholarly analysis of the data are included in each chapter. The chapters on radiation and sunshine are especially good, though the author's extensive research on dust, ozone, snow and föhn winds is evident in the corresponding chapters and excellent bibliography. (*Same item as* 6.5–4, May 1955, *MAB.*) *Subject Headings:* **1. Climate of Arosa 2. Mountain meteorology 3. Global radiation data 4. Arosa, Switzerland.**—*M.R.*

11A–47 551.587:551.524.7

*†Goldie, N.; Moore, J. G., and Austin, E. E., **Upper air temperature over the world.** *Great Britain. Meteorological Office, Geophysical Memoirs*, No. 101, **1958.** 228 p. 22 figs., 75 plates, 9 tables, bibliog. of 30 refs. Appendix 2, **Sources of data** (76 refs.). **DWB, DLC**—This monograph is one of the most important contributions to global upper air climatology of recent years and follows in the excellent tradition of the earlier monograph on upper air winds, *Geophysical Memoir*, No. 85, **1950** (*see* 11A–36, *MAB*). The principal content is a series of world charts (Mercator projection, 75°N–60°S, paired with circumpolar azimuthal charts extending down to 55°N) of average temperature and standard deviation of the daily values, for each of the mid-season months and for the 700, 500, 300, 200, 150, and 100 mb levels. These are based on radiosonde data for 1941–52, supplemented by pre-war observations as necessary. Data sources are thoroughly documented; periods of record are given for the individual stations. Additional materials are included to facilitate the use of the charts, namely: graphs of the month-to-month variation of average temperature at 35 selected stations, to aid in interpolation of values between mid-season months; world charts of the average pressure and temperature of the tropopause (from *M.R.P.* 874, of the Met. Res. Comm.), to aid in interpolation between constant pressure surfaces at high levels; vertical temperature curves for selected stations representing different regimes; longitudinal cross-sections of average temperature along 80°W, 0°, 80°E, 140°E; and world chart of absolute minimum temperature in the vicinity of the tropopause. A discussion of the statistical character of upper air temperature distributions and of the degree of confidence which may be placed on the assumption of a Gaussian normal distribution is included, along with details of the reliability of the charts in specified areas. (*Same item as* 10.7–25, July 1959, *MAB.*) *Subject Headings:* **1. Upper air temperatures 2. Global upper air climatology.**—*R. S. Quiroz.*

11A–48 551.508(02)

*†Great Britain. Meteorological Office, **Handbook of meteorological instruments, Pt. 1, Instruments for surface observations.** Its *M. O.* 577, **1956.** 458 p. 132 figs., 53 plates, 57 tables, 80 refs., 91 eqs. **DWB, DLC**—An exhaustive and well illustrated book which, in the first chapter, deals with the general requirements of meteorological instruments, recording, corrections, operational procedure and transport. Ch. 2 describes mercury and aneroid barometers and barographs, the Shaw-Dines microbarograph and standard barometers. Ch. 3 deals with thermometers (liquid-in-glass, resistance, thermocouples, bimetallic, mercury-in-steel) and photographic thermographs, tests and calibration. Ch. 4 covers psychrometers, hair hygrographs and electrical absorption and

resistance types. Ch. 5 describes wind vanes, cup and fan anemometers and pressure tube anemographs; Ch. 6, nonrecording and recording rain gages, and measurement of snow and dew; and Ch. 7 the evaporation tank, Piche and porous porcelain evaporimeters, and small evaporation pans. In Ch. 8 brief descriptions are given of the Marvin and Jordan sunshine recorders and a full account of the Campbell-Stokes, with full operational details, tropical model, starshine recorder for night cloud, and a number of instruments which measure solar radiation. The selection of visibility objects for daytime use and visibility of lights at night, visibility meters, the Loofah haze meter and the Waldrum range meter, make up Ch. 9. Ch. 10 describes instruments for measuring cloud amount, height and movement, cloud searchlights, pilot balloons for cloud height, and cloud cameras. Ch. 11 deals with instruments for use at sea. Ch. 12 covers miscellaneous subjects—inspector's kits and testing instruments, geostrophic wind scales and calculating machines. A full range of barometer correction and reduction tables completes the book. (*Same item as* 7.11–19, Nov. 1956, *MAB.*) *Subject Headings:* **1. Instrument manuals 2. Meteorological instruments.**—*C.E.P.B.*

11A–49 519.2:551.58(02) 551.577.37

†Gumbel, E. J. (*Columbia Univ.*), **Statistics of extremes.** N. Y., Columbia Univ. Press, **1958.** 375 p. graphs, tables, eqs. Bibliog. (about 500 refs.) p. 349–371. Price: **$15.00. DLC**—A unique textbook for engineers, statisticians, meteorologists, hydrologists, climatologists, etc., giving in the simplest possible form the developments and applications of modern theory of extreme values needed for practical calculations of rare events. The eight major chapters cover: I. History, methodology and specific tools; II. Order statistics and their exceedances; III. Exact distribution of extremes; IV. Analytical study of extremes; V. The first asymptotic distribution; VI. Uses of the first asymptote; VII. The second and third asymptotes; and VIII. The asymptotic distributions of range and midrange, external quotients and geometric range. The only mathematics needed to use this book is simple "calculus, analysis statistics and probability theory." Graphical methods are used wherever possible. Useful nomograms and tables, and practical illustrations from hydrology and climatology are plentiful. The excellent bibliography of >600 items covers most of the world's literature on application of theory of extreme values to meteorology and hydrology, etc. through 1956. In the climatological example on p. 341–344 (Washington, D. C., Dew Points, 1905–45), the Jan. and July values are reversed on both the graph and in the tables and analysis. (*Same item as* 10.7–14, July 1959, *MAB.*) *Subject Headings:* **1. Statistics of extremes textbooks 2. Extreme value theories 3. Statistics in climatology 4. Flood frequency calculations.**—*M.R.*

11A–50 550.3(02)

*†**Handbook of geophysics for Air Force designers,** ed. by C. F. Campen, Jr. et al. Wash., D. C., Geophysics Research Directorate, Air Force Cambridge Research Center, Air Research and Development Command, U. S. Air Force, **1957.** 1st ed. 22 chapters, each separately paged. figs., tables, bibliogs., eqs. (For listing of contents, *see* Pt. III, p. 1460, Nov. 1958, *MAB.* All articles abstracted separately.) **DWB**—Over 50 authors have contributed to this remarkable and voluminous handbook for Air Force designers or engineers using geophysical data as it relates to the environment in which aircraft, rockets and missiles operate. Many areas of geophysics have been omitted for want of sufficient data. Furthermore it is not intended that the data should be used in elaborate testing. The book is composed of 21 chapters, each of which has 3 to 14 sub-chapters. The major headings are: 1) Model atmosphere, 2) Temperature, 3) Atmospheric pressure, 4) Atmospheric density, 5) Wind, 6) Precipitation, 7) Clouds, 8) Atmospheric composition, 9) Atmospheric electricity, 10) Geomagnetism, 11) Meteors, 12) Terrestrial surface parameters (soil, snow, ice, oceans, earthquakes, permafrost, geodesy), 13) Tropospheric propagation, 14) Visibility, 15) Ionosphere, 16) Thermal radiation, 17) The sun, 18) Cosmic radiation, 19) Jet condensation trails, 20) Sounding devices (rockets, meteorological instruments, balloon systems), and 21) Acoustic propagation. Extensive bibliographies accompany some of the chapters; numerous tables, graphs, photographs, nomograms, frequency distributions and a subject index with 223 major headings and about 1000 sub-headings are included. Maps show the distribution of such factors as wind chill; January and July design temperatures; geomagnetic factors; thunderstorm frequency (monthly, seasonal and annual); sea level, 700, 500, 300, 200, 100 and 50 mb-flow patterns over the Northern Hemisphere; earthquakes in 1955; auroral frequencies; wind speeds, etc. (*Same item as* 10.1-3, Jan. 1959, *MAB.*) *Subject Headings:* **1. Handbook of Geophysics 2. Upper air data 3. Design data handbooks. I. Cole, A. E.** (*ed.*) **II. Condron, T. P.** (*ed.*) **III. Ripley, W. S.** (*ed.*) **IV. Sissenwine, Norman** (*ed.*) **V. Solomon, Irving** (*ed.*).—*M.R.*

11A–51 551.5(02):016

†Hann, Julius von, **Hann-Süring Lehrbuch der Meteorologie.** [Hann-Süring textbook on meteorology.] 5th ed., completely rev. Leipzig, W. Keller, **1939–1951.** 2 v. (1092 p.) numerous figs., tables, refs. and eqs. (1st Lieferung, 1939; 11th and final Lieferung, 1951). **DLC** (QC861.H142) —The chief value of the **Hann-Süring Lehrbuch** is not its usefulness as a textbook, but as a handbook

because of its thousands of references, and citations and illustrative tables of data (organized in a logical and easily usable manner) which exhaustively treat of every theoretical and practical phase of meteorology. (*Same item as* 3.9–6, Sept. 1952 and 6A–142, Jan. 1955, *MAB.*) *Subject Headings:* **1. Meteorology textbooks 2. Meteorology bibliographies 3. Handbooks.**—*M.R.*

11A–52 551.579.4(02)

†Hoyt, William Glenn and Langbein, Walter B., **Floods.** Princeton, N. J., Princeton Univ. Press, **1955.** 469 p. 9 tables, 50 figs., 31 photos., bibliog. p. 433–443. **Floods, by stream,** p. 413–431. **DWB**—A readable but thoroughly technical text covering flood problems, especially those affecting the U. S. Rainstorms, thunderstorms, hurricanes, extreme rainfalls, snow and ice jams are discussed in Ch. 2 (p. 12–34). Life history of floods, flood frequency and measurement of floods are found in Ch. 3, Flood damage in Ch. 4, and a catalog of floods before and since 1900, and by streams, in Ch. 10. The latter chapter gives a detailed description of many of the floods as well as statistics on damage, etc. The book contains numerous original charts, diagrams and nomograms and gives a thorough insight into flood forecasting techniques used in the U. S. (*Same item as* 7.7–4, July 1956, *MAB.*) *Subject Headings:* **1. Floods 2. Flood forecasting 3. Flood data 4. Textbooks.**—*M.R.*

11A–53 551.481.1(02)

†*Hutchinson, George Evelyn (*Dept. of Zoology, Yale Univ.*), **Treatise on limnology, Vol. 1, Geography, physics, and chemistry.** New York, John Wiley; London, Chapman & Hall, **1957.** 1015 p. 228 figs., 132 tables, bibliog. and index of authors, p. 913–978. List of symbols, p. 903–912. **DLC** (QH98.H82)—This is one of the most refreshing books to come out during the past few years. It is the first of two volumes on limnology—the second will treat the biology, ecology, and stratigraphy of lakes. The chapters which are of most interest are: 1) origin of lakes; 2) morphology; 3) the properties of water; 4) the hydrologic cycle and water balance of lakes; 5) hydromechanics of lakes; 6) optical properties; 7) thermal properties; 8) inorganic ions of rain, lakes and rivers; 9) oxygen in lake water; 10) CO_2 and pH concentration; and 16) nitrogen cycle. A very extensive bibliography, list of lakes, and subject index are appended. Of special interest to meteorologists are the sections in Ch. I on glacial and wind formation of lakes and in Ch. IV on precip.-lake level relations; Ch. V on currents, waves and seiches; Ch. VI solar radiation, reflection, absorption, transmission, illumination, extinction, scattering, polarization, color mirages, solar or lunar paths, cosmic radiation, etc.; Ch. VII heating, stratification, winter heating, ice effects, turbulence, eddy conductivity, heat budgets of lakes of the world, wind work, stability, energy exchange, evaporation, effects on surrounding climate, lake ice, and in Ch. VIII on the chemistry of rain water. Most of these sections are quite extensive, covering every aspect of the subject treated in the literature up to 1954 (over 1600 references are cited), and presenting voluminous graphic, tabular and cartographic data. (*Same item as* 9.9–6, Sept. 1958, *MAB.*) *Subject Headings:* **1. Limnology textbooks 2. Limnology bibliographies 3. Optics of lakes.**—*M.R.*

11A–54 551.515.4:551.594.21(08)

†Israël, Hans (*ed.*) and others, **Das Gewitter: Ergebnisse und Probleme der modernen Gewitterforschung.** [The thunderstorm: results and problems of modern thunderstorm research.] Leipzig, Akademische Verlagsgesellschaft Geest & Portig, **1950.** 249 p. numerous figs. (incl. photos), diagrs., graphs, tables, bibliog. p. 220–241. Introduction in German, French and English. (*Probleme der Kosmischen Physik*, Vol. 25.) **DLC** (QC968.I8)—A series of articles by noted German meteorologists, providing a comprehensive compilation of knowledge about the meteorology of thunderstorms, theories on the origin of thunderstorm electricity, radioelectric disturbances caused by lightning or charges in clouds, and various other phases of thunderstorm activity (geographical frequency, relation to solar activity, synoptic aspects, cloud physics, etc.). The separate articles are by: R. Mügge, H. Siedentopf, O. Dinkelacker, H. Wichmann, F. Rossman, E. Wall, H. W. Kasemir, H. Meinhold, E. Huss, H. Flohn, H. Israël, H. Weickmann, and J. Kuettner. A substantial section of this compendium is devoted to a discussion of the Thunderstorm Project in the U. S. and the results thereof, by J. Kuettner; two reviews by Israël and Möller of notable works on the subject such as those by Beer, Louis P. Harrison, T. E. Allibone, G. D. Robinson, J. F. Shipley, F. E. Lutkin, G. C. Simpson, Whipple and Chalmers, Ross Gunn, Jean Bricard, K. B. McEachron, and C. Kramer; and a bibliography of 431 references arranged chronologically for the years 1939–1949. (*Same item as* 3.9–8, Sept. 1952; 4K–218, Nov. 1953 and 6B–74, Feb. 1955, *MAB.*) *Subject Headings:* **1. Thunderstorms 2. Thunderstorm electricity 3. Collected works 4. Bibliographies.**—*M.R.*

11A–55 551.510:523.51:08 551.590.25

†Kaiser, T. R. (*ed.*), **Meteors.** Special supplement (vol. 2) to the Journal of Atmospheric and Terrestrial Physics. London, Pergamon Press, **1955.** 204 p. numerous bibliogs. and illus. **DWB**

—A collection of 39 papers which were read at the Symposium on Meteor Physics held at Jodrell Bank Experimental Station in July 1954, on invitation of A. C. B. Lovell, are printed in permanent book form. (Each paper abstracted separately; contents are listed in Pt. III, p. 927, July 1956, *MAB.*) The subjects treated include meteor ablation, luminosity, ionization, spectra, collision processes, radio echoes, masses, space density drift, zodiacal dust cloud, orbits as determined photographically or by radio, effects on ionosphere and upper air data obtained from meteors (pressure, winds, scale height). (*Same item as* 7.7–1, July 1956, *MAB.*) *Subject Headings:* **1. Meteor physics symposia 2. Ionospheric physics 3. Jodrell Bank, Eng.**—*M.R.*

11A–56 551.5(030.8)

Keil, Karl, **Handwörterbuch der Meteorologie.** [Meteorological glossary.] Frankfurt a.Main, Fritz Knapp, **1950.** 604 p. figs., tables, refs. (in text). **DWB, DLC** (QC854.K4)—An excellent glossary of over 3500 meteorological and related terms used in technical German literature. Definitions of terms range in length from one line to 5 pages (e.g., on Actinometers). There are many illustrative diagrams, charts, tables, etc. to add precision to the definitions and break the monotony of the longer textual essays. In addition to definitions of technical terms, the glossary contains numerous items which show evidence of the broad perspective and imagination of the author in providing material which would be useful to every writer, student or library in the world. For instance, there are scores of biographical entries, not only for prominent German scientists of the past and present, but for many of the most renowned of England, France, Russia, the U. S., etc. Then there are pertinent facts about many geographical places frequently mentioned in meteorological literature (Katmai, Ficktelberg, and others) and observatories (Blue Hill, Mount Weather, Lindenberg, Friedrichschafen, etc.). Symbols used to represent physical constants in meteorology are defined as well as signs and symbols used in international synoptic codes. Samples of forms used in synoptic meteorology and climatological observations are included. Another useful feature is the inclusion of references to the leading meteorological and geophysical publications (periodicals such as *Meteorologische Zeitschrift, Meteorologische Rundschau, Annalen der Meteorologie, Quarterly Journal of the Royal Meteorological Society, Petermanns Mitteilungen*, etc.). A few American or English terms used in airways work are included. (*Same item as* 2.1–1, Jan. 1951, *MAB.*) *Subject Headings:* **1. Meteorological glossaries 2. German meteorological glossaries.**—*M.R.*

11A–57 551.5(09)

†Khrgian, A. Kh., **Ocherki razvitiia meteorologii, Tom. 1.** [Notes on the development of meteorology, Vol. 1.] 2d ed. Leningrad, Gidrometeoizdat, **1959.** 427 p. 82 figs., photos, 9 tables, foot notes, 110 refs., eqs. (For abstract on 1st ed., 1948, *see* 1–34, Jan. 1950, *MAB.*) **DWB** (M(09) K45oc 1959), **DLC** (QC855.K52)—Books on the history of meteorology as a science have been few and far between [**Shaw's Manual of Meteorology,** Vol. I, **1926**; Khrgian's **Ocherki** or "Notes on the Development of Meteorology," **1948**; and Schneider-Carius' **Wetterkunde . . . Geschichte, 1954** (*see* 6.7–5, July 1955, *MAB*); plus a chronological history in Japanese by Okada and Arakawa (*see* 8.7–11, July 1957, *MAB*)], so it is gratifying that Khrgian has taken the trouble to completely reissue and greatly enlarge his excellent **Ocherki** after only 11 years. The present volume thoroughly covers the period from antiquity to 1920, with only brief notes on the most recent developments in radiosondes, rockets, satellites, etc. The work is far better documented and contains many more illustrations of early synoptic charts, instruments, personalities, etc., is better bound, contains more foot-references and about 75 more pages of text than the first. The amount of scholarly, yet extremely interesting, detail in this history is amazing, and there is no lack of balance in credit given to western (e.g., American, British, French, German, and Scandinavian) contributions from the earliest records to the present, though, of course, there is a lot of factual information about Soviet developments in networks, expeditions, climatology, instrumentation, synoptic meteorology, radiation, etc. which is unknown to most western meteorologists, as such have been completely ignored by Shaw, Okada, Schneider-Carius and other familiar writers. The fact that a second volume is planned for the period 1920–date, thus allowing more space for the pre-1920 material, gives the author the opportunity to reorganize the material somewhat. The 17 chapters are devoted to: 1. History of science in Greek and Roman times; 2. In the Middle Ages; 3. First meteorological instruments and their application; 4. Renaissance of science and origins of meteorological theory in 17th and 18th centuries; 5. First steps in climatology; 6. First series of instrumental observations and development of networks; 7. Instruments and methods developed in 19th century; 8. Development of meteorological institutes; 9. Beginning of weather services; 10. Research on cyclones and anticyclones; 11. Theory of structure of cyclones and anticyclones; 12. Development of idea of fronts; 13. History of dynamic meteorology in 18th and 19th centuries; 14. General circulation theory and representation; 15. History of upper air research; 16. Climatology in recent years; 17. History of atmospheric optics and actinometry. The postscript (p. 401–415) gives a birds-eye-view of progress since the Great October Revolution: International cooperation (WMO, 2nd Polar year,

IGY), frontal methods, general circulation, upper atmosphere research, rockets, long range forecasting, climatology, etc. Appended are comparative tables for 16 thermometric scales and 9 different Beaufort Scales for sky and weather phenomena. Alas there is no subject or author index. *Subject Headings:* **1. History of meteorology 2. Russian meteorological development.**—*M.R.*

11A–58 551.5(030.8)

†Khromov, Sergeĭ Petrovich and Mamontova, L. I., **Meteorologischeskiĭ slovar'.** [Meteorological glossary.] Leningrad, Gidrometeoizdat, **1955.** 454 p. numerous figs., 72 refs. **DLC**—A glossary consisting of about 4000 terms (works, phrases and a few names) used frequently in meteorological literature, including a number of terms from related fields (mathematics, physics, hydromechanics, astronomy, geography, hydrology) which have frequent applications in meteorology as well as formulas and units of measurement. Geographical places, journals and biographical material are excluded. Most of the definitions are concise, but many are accompanied by clear illustrations (instruments, charts, etc.). Composite terms are in the majority, and all are in pure dictionary style (not classified or inverted). (*Same item as* 7.8–10, Aug. 1956, *MAB.*) *Subject Headings:* **1. Meteorological glossaries 2. Russian meteorological glossaries.**—*M.R.*

11A–59 551.511(08) 551.511:532.5(02)

†Kochin, Nikolaĭ Evgrafovich, **Sobranie sochineniĭ.** [Collected works.] Moscow, Izdatel'stvo Akademii Nauk SSSR, **1949.** 2 vol. Vol. 1, **Dinamicheskaia meteorologiia** [Dynamic meteorology]. 613 p. figs., tables, refs., bibliog. (91 refs.). Vol. 2, **Gidrodinamika i aerodinamika** [Hydrodynamics and aerodynamics]. 586 p. numerous figs., and eqs., bibliog., photo of Kochin. **DLC** (QC852.K8)—In Vol. 1, a short biographical sketch by P. Ia. Polubarinova-Kochina (wife of N. E. Kochin) tells of his education, early military service, scientific, academic and official connections; his collaborators and students. He owed much to A. A. Fridman who founded the Department of Dynamic Meteorology at the Leningrad Geophysical Observatory (1920). Kochin succeeded Fridman on the death of the latter in 1925, and in his Institute of Theoretical Meteorology, his wife, Izvekov, Kibel' and Keller made further investigations in theoretical and applied hydrodynamics and meteorology. A chapter by A. A. Dorodnitsyn, I. A. Kibel', and L. I. Sedov goes into detail about the principal works of Fridman, Kochin and their associates; based on the theoretical work of Rayleigh (1917), Shaw (1919) and the Bjerkneses. The main part of the volume (p. 27–613) consists of a selection of 25 of the most important works on dynamic meteorology (91 are listed in the bibliography on p. 20–24) written by Kochin during the period 1922–1942 and published in leading Russian, German and French scientific journals from 1923 to 1949 (four years after his death). The first paper was **On the change of a vortex through adiabatic motion in the absence of any inflow of energy** (*Zeit. für Physik*, **1923**). Another one was on a **Theoretical model of a moving cyclone** (1924), many were on the theory of discontinuities, the polar front and other boundary layer problems which appeared shortly after Rossby's 1924 paper (*Geografiska Annaler*, p. 180). A paper on the **Stability of the zonal circulation** (1927), and one published in 1935 **On the change of temperature and pressure in the free atmosphere** (p. 531–591) are classical papers giving the basic integral equations and graphic models for quantitatively evaluating changes in solenoidal fields—works which lead to the practical applications of Kibel' (1940–1943). Another classic work in application of hydrodynamic theory to the atmospheric circulation is comprised in the three papers published in 1937 on the **Influence of relief (ground profile) on waves at the boundary of two air masses of different density** (p. 448–508). Kochin was recognized as an authority on many other phases of mathematical physics, aerodynamics, hydrodynamics and pure mechanics, and did practical work in ballistics, jets, turbulence, shock waves, explosive waves, slip streams, etc., and taught many courses in the universities at Leningrad, Moscow and Kazan (where he lost a leg during the invasion) and in military or naval academies. He died on New Year's Eve (1944–1945). Vol. II constitutes major theoretical treatise on wave motion in gases and liquids, both in confined and free spaces, along boundary layers and in stratified media. Great stress is placed on shock waves in ideal fluids, and other recent problems of aerodynamics, as well as the more classical problems of hydrodynamics. Boundary layer theories developed by French, German and Russian mathematical physicists working in this field, are reviewed. Not a meteorological work; but presents theory basic for meteorologists, written by a meteorologist. (*Same item as* 10–57, Oct. 1950; and 8–36, Aug. 1950, *MAB.*) *Subject Headings:* **1. Hydrodynamics textbooks 2. Aerodynamics textbooks. I. Kochin, N. E.**—*M.R.*

11A–60 551.521.14:535.243:551.578.46

*†Krinov, E. L., **Spektral'naia otrazhatel'naia sposobnost' prirodnykh obrazovaniĭ.** [Spectral reflectance properties of natural formations.] Moscow, Akademiia Nauk, **1947.** 270 p. 177 figs., 15 tables, 45 refs., append. 70 p., tables. **DLC.** Transl. by E. Belkov, issued as *National Research Council of Canada, Technical Translation*, TT-439, **1953.** 268 p. 27 figs., 15 tables, 45 refs. in text.

DWB—Results of 370 spectrophotometric measurements of albedo of numerous types of natural surfaces are analyzed with basic data listed in tables and curves of intensity in wave lengths from .4–.9μ for each observation systematically presented. Among the types of surface covered are inland waters, forest (birch, oak, fir, willow, linden, pine, elm, larch), grasses, tundra, orchards, gardens stone and dirt roads, snow cover, buildings, etc. Not only are various types of each of the above surfaces analyzed, but variation in each type, according to season, homogeneity, stage of development, etc. are treated separately. The textual section treats of the theory of spectrophotometry, methods of observation, details of instrumentation for use in aerial photography of albedo and methods of compiling data. Spectrophotometric observations were made in nine regions of the European U.S.S.R. from Arctic to subtropics (including tundra, taiga, chernozem, forested steppe, steppe, desert and mountain areas) between 1932 and 1942. A total of 905 reels and 10,316 spectrograms were obtained and analyzed, constituting one of the most worthwhile contributions to the general and detailed calculation of the earth's albedo from a practical and a theoretical standpoint. (*From items* 3.3–131; 7G–12; 8D–48; 8G–59, *MAB.*) *Subject Headings:* **1. Albedo of earth 2. Spectral reflectance of natural surfaces 3. Aerial photography 4. U.S.S.R. I. Belkov, E.** (*transl.*). —*M.R.*

11A–61 551.506.7:551.557(264)

*Kuhlbrodt, Erich, **Die Höhenwinde über dem tropischen und südlichen atlantischen Ozean (Messungen der Deutschen Seewarte bis 1939 eingeschlossen), erste Lieferung, Abschnitt A, Allgemeine statistische Bearbeitung der Höhenwindmessungen.** [Upper winds over the tropical and southern Atlantic Ocean (Deutsche Seewarte measurements through 1939), First issue, Section A, General statistical analysis of upper wind measurements.] *Deutsche Atlantische Expedition* (*Meteor*), *1925–1927, Wissenschaftliche Ergebnisse*, Vol. 16, Pt. 1, Ergebnisse der Aerologischen Beobachtungen, issued Berlin, Walter de Gruyter, **1958.** 91 p. 3 figs., 17 charts, 7 tables. Also: **Zweite Lieferung, Abschnitt B, Weitergehende statistische Bearbeitung für ausgewählte Felder.** [Second issue, Section B, Detailed statistical analysis for selected areas.] *Ibid.*, Vol. 16, Pt. 1, p. 93–168, Berlin **1958.** 28 figs., 27 charts, 36 tables. **DLC** (Q115.D448)—Results of 7000 pilot balloon ascents made by the Deutsche Seewarte in the tropical and South Atlantic Ocean, are summarized and presented in tabular and graphic form. The highest flights obtained were to 22 km. A chart shows the regional and seasonal distribution of the 4600 ascents made up to the end of 1937 between 20°N and 75°S. Methods of computation, vertical sections over the ocean (by seasons) and variability are given on charts or graphs, and extensive tables give the wind (direction and speed) frequencies at different levels, seasons for 10° lat. × 30° long. belts, and mean wind factors (vector and scalar speeds and constancy) for 5° lat. × 5° long. areas from 20°N to 30°S and 5° × 10° areas S. of 30°S. The flights began in 1924 and continued through 1939, and are evenly distributed throughout the year (400–500 a month). Only about half of the 5200 flights tabulated reached 5000 m, $\frac{1}{6}$ reached 10,000 m, 5% reached 15 km, and 122 reached the stratosphere (18 km). In high latitudes the flights were much shorter than in low latitudes. While Sec. A contains semiannual values for the entire region, Sec. B gives quarterly or monthly values for areas for which sufficient data are available. Seasonal variations of vertical wind distribution and of nonperiodic variations are included. The data are presented without comment; their detailed discussion is forthcoming as Sec. C. (*Same item as* 9.11–23, Nov. 1958, *MAB.*) *Subject Headings:* **1. Upper air winds 2. Upper air wind data summaries 3. South Atlantic 4. Tropical Atlantic.**—*M.R.*

11A–62 551.5:52 551.507.362.1

†Kuiper, Gerard Peter (*ed.*), **The atmospheres of the earth and planets.** Rev. ed. Chic., Univ. of Chicago Press, **1952.** 434 p. 93 figs., 16 plates, tables, refs., bibliogs., eqs. "Papers originally presented at the **Symposium on Planetary Atmospheres, Univ. of Chicago, Sept. 8–10, 1947."** (For abstract on the first edition (1949), *see* 10–4, Oct. 1950, *MAB.*) **DWB, DLC** (QB505 K8 1952)—The first edition of this excellent collection of articles on planetary atmospheres (published in 1949) contained one chapter by J. FRANCK which was deleted in the second edition by the editor, who added some new data in support of photosynthesis on Mars in his chapter on the **Origin of planetary atmospheres** (Ch. XII, p. 306–405). Several other chapters have been revised and enlarged to include new data on night sky and auroral spectra, rocket investigations, etc. The 14 chapters range in subject matter from **The general circulation of the Earth's atmosphere** (C.-G. Rossby), **Scattering in planetary atmospheres** (H. C. van de Hulst), **Density of upper atmosphere** (F. L. Whipple et al.), **Atmosphere above 300 km** (L. Spitzer, Jr.), **Evolution of earth's atmosphere** (R. T. Chamberlin), **Rare gases** (H. Brown), **Infrared spectroscopy** (A. Adel and M. V. Migeotte), **Spectroscopy of planets at Mt. Wilson** (Theodore Dunham, Jr.), and **Laboratory absorption spectra with long paths** (G. Herzberg). Appended are data and a model of the upper atmosphere, and numerous spectrograms. (*Same item as* 4.6–6, June 1953, *MAB.*) *Subject Headings:* **1. Planetary atmospheres 2. Rocket research 3. Photosynthesis on Mars 4. Upper atmosphere densities.**—*M.R.*

11A–63 523.7(02)

†*Kuiper, Gerard Peter (*ed.*), **The sun.** Chicago, Univ. of Chicago Press, **1953.** 745 p. numerous figs., (incl. photos), tables, eqs. Bibliogs. at end of most chapters or sections. **DWB**—This is Vol. 1 of a series of four volumes on **The Solar system.** The second volume is **The earth as a planet** (11A–64), the third **Planets and comets.** The present volume contains the following chapters: **I. Introduction,** by Leo Goldberg (historical solar constants, solar physics, solar terrestrial relationships, solar atmosphere); II. **The sun as a star,** by Bengt Strömgren; III. **The photosphere,** by M. Minnaert; IV. **The identification of solar lines,** by Charlotte E. Moore; V. **The chromosphere and the corona,** by H. C. van de Hulst; VI. **Solar activity,** by K. O. Kiepenheur; VII. **Solar radio emission,** by J. L. Pawsey and S. F. Smerd; VIII. Solar electro-dynamics, by T. G. Cowling; IX. **Empirical problems and equipment,** by C. W. Allen, P. C. Keenan, R. R. McMath, J. W. Evans, W. O. Roberts, R. Tousey, J. G. Wild, H. W. Dodson, A. Ehmert, J. A. Simpson and others. The entire range of subjects in the field of astrophysics is included: for instance, measurement of solar constant, the zodiacal light, ionosphere during eclipses, rocket observations of UV; extreme UV and X-rays, radio frequency radiation from sun, solar flares, 200 cm/sec radiation, cosmic rays from sun, Alfvén's theory of magnetic field in sunspots, corpuscular streams, auroras; and of course historical and bibliographic material, tables of constants, etc. (*Same item as* 5.8–5, Aug. 1954, *MAB.*) *Subject Headings:* **1. Solar physics textbooks 2. Solar radio emissions 3. Cosmic radiation 4. Astrophysics 5. Compendiums.**—*M.R.*

11A–64 551.510.5

†Kuiper, Gerard P. (*ed.*), **The earth as a planet.** Chicago, Univ. of Chic. Press, **1954.** 751 p. figs., photos, tables, bibliogs. throughout. **DLC**—The 15 articles collected and arranged in a logical order in this second volume of an astrophysical compendium cover the dynamics of the earth as a planet, the structure of the earth's interior, the earth's crust, mountains, etc., the oceans, geochemistry, upper atmosphere, biochemistry and the properties of the upper atmosphere that would aid in studies of other planets or stars by analogy. Of special interest to meteorologists are the following chapters: Sverdrup, H. U., **Oceanography,** p. 215–257. Byers, H. R., **Atmosphere up to 30 kilometers,** p. 298–370. Hutchinson, G. E., **Biochemistry of the terrestrial atmosphere,** p. 427–433. Goldberg, Leo, **Absorption spectrum of the atmosphere,** p. 434–490. Whipple, Fred L., **Density, pressure and temperature data above 30 kilometers,** p. 491–513. Chamberlain, J. W. and Meinel, A. B., **Emission spectra of twilight, night sky, and aurorae,** p. 514–575. Bates, R. D., **Physics of the upper atmosphere,** p. 576–643. Nicolet, M., **Dynamic effect in the high atmosphere,** p. 644–712. Holliday, Clyde T., **The earth as seen from outside the atmosphere,** p. 713–725. Danjon, André, **Albedo, color and polarization of the earth,** p. 726–738. (*Same item as* 7.11–4, Nov. 1956, *MAB.*) *Subject Headings:* **1. Earth as a planet 2. Upper atmosphere physics.**—*M.R.*

11A–65 551.58:519.24(02)

*†Leningrad. Glavnaia Geofizicheskaia Observatoriia, **Metody klimatologicheskoĭ obrabotki meteorologicheskikh nabliudeniĭ.** [Methods of climatological analysis of meteorological observations.] [Edited by O. A. Drozdov.] Leningrad, Gidrometeoizdat, **1957.** 492 p. 180 figs., 226 tables, bibliog. p. 490–492. **DLC** (QC981.L44)—The editor of this new manual or textbook in climatological methodology prepared an elementary text which was published in 1956 (*see* 9.4–4, April 1958, *MAB*), and which gave the general methodology based on classical examples. The present work is a more thorough and extensive textbook setting forth the detailed methods of analysis of meteorological data for climatological purposes used by the scientific workers at the main Geophysical Observatory in Leningrad. The text is divided into 6 main chapters and over 30 subchapters. Ch. I covers general principles and statistical cartographic methods. Ch. II reviews the processing of surface water data (temperature, pressure, wind, precipitation, snow cover, humidity, cloudiness, sunshine, soil temperature, fog, snowstorms and thunderstorms). Ch. III goes into processing of aerological data (upper air temperature, tropopause, inversions, freezing level, tropospheric winds and humidity, cloud heights, icing frequency and synoptic climatology according to air flow). Ch. IV covers marine climatology (accuracy of observations, problems of location, annual course of elements, frequencies, special elements such as pressure, temperature of sea and air, humidity, clouds, rain and fog, wind, ice cover, humidity deficit, marine climatic charts, and interpolation of marine charts and tables for long period or regional comparisons). Ch. V deals with moisture balance calculations (general circulation, evaporation and precipitation relations) and Ch. VI with heat balance calculations (heat balance of underlying surface, radiation balance, heat exchange due to evaporation and turbulence, and examples. (*Same item as* 10.5–15, May 1959, *MAB.*) *Subject Headings:* **1. Climatological methodology 2. Statistical methods in climatology 3. Cartographic method in climatology. I. Drozdov, O. A.** (*ed.*).—*M.R.*

11A–66 551.501.4:551.506.1(02)

*Leningrad. Glavnaia Geofizicheskaia Observatoriia, **Rukovodstvo po podgotovke meteorologicheskikh ezhegodnikov.** [Handbook for preparation of meteorological yearbooks.] Leningrad,

Gidrometeoizdat., **1955.** 220 p. 51 figs. (some fold.), 155 tables. **DLC**—The separate chapters cover: 1) general information (station location tables and charts, description of stations, etc.); 2) technical control of the tabular material; 3) critical examination of the meteorological elements in the annual tables, specifically those on pressure, temperature, humidity, cloudiness, wind, precipitation, snow cover, atmospheric phenomena, soil temperature, sunshine duration and precipitation from automatic pluviographs; and 4) contents of yearbooks. This exceedingly detailed handbook gives instructions for preparation of all phases or sections of the annual meteorological summaries for the entire Soviet Union, with numerous examples, sample forms, etc. The methods of control are illustrated by statistical and graphical analyses that make use of correlation of elements between each other in time and space to show up errors. (*Same item as* 8.6–10, June 1957, *MAB.*) *Subject Headings:* **1. Manual for compilation of yearbooks 2. Climatic summaries 3. Annual meteorological data summaries 4. U.S.S.R.**—*M.R.*

11A–67 551.584:551.551:551.506.5 551.510.522

*†Lettau, Heinz H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile. Proceedings of the Great Plains Turbulence Field Program, Aug. 1–Sept. 8, 1953,** O'Neill, Nebraska. Pub. by the Pergamon Press, N. Y., on behalf of the Geophysics Research Directorate, Air Force Cambridge Research Center, Air Research and Development Command, **1957.** 2 vol. (578 p.). Vol. 1 (p. 1–376, **Instrumentation and data evaluation.** Vol. 2, p. 377–578, **Site description and data tabulation.** numerous tables, figs. (incl. photos), refs., eqs. Price: $20.00. Contents of Vol. 1: (p. 1–6, **History and general objectives of the program, Summary of the instrumentation and data collection phases, and General conclusions.** p. 7–16, **Synoptic material.** p. 17–80, **Subsoil measurements.** p. 81–125, **Interface measurements.** p. 126–198, **Mast profile data (meaned quantities).** (p. 199–275, **Free air observations.** p. 303–372, **Appendix.** (For listing of contents, *see* Pt. III, (p. 379, March 1958, *MAB.*) **DLC** (QC869.U47)—The proceedings of the comprehensive Great Plains Turbulence Field Program (Aug. 1–Sept. 8, 1953) at O'Neill, Nebr., which was under the general direction of the Geophysics Research Directorate of AFCRC, with assistance of or participation by 10 universities and 4 government agencies, are presented in these two volumes. The history and objectives of the micrometeorological and aerological program, the site, instrumentation, etc. is followed by 65 separate scientific papers on every instrumental and observational aspect of the program. Some of the papers are only 1 or 2 pages long—others are major articles 35–40 pages in length. The variety of observations can be seen in the table of contents, ranging from ozone concentration profiles (p. 188–198), ping pong ball anemometers (p. 140–144), refractive index fluctuations (p. 220–227), etc. to radiosonde (p. 293–295, and 298), soil density, temperature, conductivity and moisture measurements (p. 17–80) and radiation measurements (p. 81–98) of various types; and dew (p. 123–125), drag (p. 104–117) and smoke puff drift (p. 117–119). Vol. II contains a description of the site, climatology of the region and of the year 1953, scheduling of observations, annotation on the method of data presentation, and the data grouped in 7 general observational periods of 25 hours each. (*Same item as* 9.3–1, March 1958, *MAB.*) *Subject Headings:* **1. Great Plains Turbulence Field Program 2. O'Neill, Nebr. I. Great Plains Turbulence Field Program, Aug. 1–Sept. 8, 1953, O'Neill, Nebr.**—*M.R.*

11A–68 551.546(99)

†Makerov, Iu. V., **Osnovnye cherty gidrologicheskogo rezhima antarkticheskikh vod.** [Basic features of the hydrological regime of the Antarctic waters.] *Moscow. Gosudarstvennyi Okeanograficheskii Institut, Antarktika,* Vol. 2, **1956.** 103 p. 18 figs., 19 tables, 73 refs. **DLC** (GB397.M6)—The first volume (*see* 8.3–12, March 1957, *MAB*) on the Antarctic gave a thorough survey of the climate and meteorology of the Antarctic Continent. The present volume on the basis of expeditions up to 1953, covers the hydrography and oceanography of the Antarctic seas: I. annual hydrologic characteristics; 1) boundaries; 2) bottom relief and depth; 3) major influences on currents, waves, salinity, density, temperature, etc.; 4) spatial variation in these characteristics; 5) temporal variations in elements; 6) circulation of waters. II. types of water in Antarctic; 1) basic influences; 2) types of water; 3) surface waters; 4) depth waters; 5) intermediate waters. III. ice in Antarctic waters; 1) sea ice; 2) continental or glacial ice. A good bibliography and a large number of oceanographic cross sections are appended, and a large number of tabular and graphic data charts. (*Same item as* 10.6–12, June 1959, *MAB.*) *Subject Headings:* **1. Antarctic oceanography 2. Antarctic seas.**—*M.R.*

11A–69 551.5(030.8)

Mamontova, Lydia Ivanovna and Khromov, Sergeĭ P., **Anglo-russkiĭ meteorologicheskiĭ slovar'.** [English-Russian meteorological glossary.] Leningrad, Gidrometeoizdat, **1959.** 172 p. **DLC** (QC854.M3)—An excellent compilation of about 12,000 English terms used in meteorological literature, and their equivalents in Russian. (For fuller abstract, *see* 11.1–87, Jan. 1960, *MAB.*) *Subject Headings:* **1. English-Russian meteorological glossaries 2. Russian language glossaries 3. Meteorological glossaries.**—*M.R.*

11A–70 551.5(99) 551.582(99)

*†**Meteorology of the Antarctic,** ed. by M. P. van Rooy. Pretoria, South Africa, Weather Bureau. **1957.** 240 p. figs. (some fold.), tables, map (in pocket). Bibliog. p. 233–240 (330 refs.). (For listing of Contents, *see* Pt. III, p. 914, July 1958, *MAB.*) **DWB, DLC** (QC851.S83 No. 24). Review in *Weather*, 13(7):244–245, July **1955.** Review in *World Meteorological Organization, WMO Bulletin.* 7(2):94–95, April **1958.**—This is an epochal publication, covering systematically, if not exhaustively, the many aspects of Antarctic meteorology and climatology, and local data for the oceans, islands and various portions of the continent for which data are available. It is complete with glossy photos of glacier, snow, ice and ocean features, clouds, large charts, numerous tables and graphs, lists of expeditions and >300 references to the best scientific sources of meteorological data or information —in fact—a complete climatology of this little explored area of the globe up to the beginning of IGY. The volume was planned by T. E. W. Schumann, Director of the S. African Weather Bureau, as a companion volume to an elaborate bibliography (>4000 entries) of Antarctic meteorological literature. Ch. 1) covers the geography and hydrology; Ch. 2) the sources of meteorological data; Ch. 3) instrumentation and observation of special elements in the Antarctic; 4) pressure; 5) precip. and evaporation; 6) climate of Antarctic seas; 7) of sub-Antarctic islands; 8) of Antarctic coast; 9) of Graham Land Region; 10) upper air conditions (temp. and wind); 11) history and problems of synoptic analysis of the Southern Hemisphere, anticyclones, depressions, cyclone tracks, pressure types, etc. (*Same item as* 9.9–1, Sept. 1958, *MAB.*) *Subject Headings:* **1. Antarctic meteorology 2. Antarctic climatology 3. Antarctica. I. Schumann, T. E. W.** (*ed.*) **II. Hofmeyr, W. L.** (*ed.*) **III. Venter, R. J.** (*ed.*) **IV. van Rooy, M. P.** (*ed.*).—*M.R.*

11A–71 551.506.5(99) 551.506.22(09)

*†Morskaia Antarkticheskaia Ekspeditsiia na Dizel'-Elektrokhode "Ob'," 1955–1956, **Opisanie ekspeditsii na dizel'-elektrokhode "Ob'," 1955–1956.** [Description of the expedition on board the Research Ship "Ob," 1955–1956.] Ed. by Ivan P. Bardin. Moscow, Akademiia Nauk SSSR, **1958.** 237 p. 72 figs., 24 tables, bibliogs. throughout. English summary p. 236. **DWB** (M06.22 M886op), **DLC** (GC461.M6). Also its: **Aerologicheskie i meteorologicheskie issledovaniia, dizel'-elektrokhod "Ob'," 1955–1956.** [Aerological and meteorological studies, Research Ship "Ob," 1955–1956.] Leningrad, Gidrometeoizdat, **1958.** 183 p. Almost entirely tables. **DLC** (QC994.8.M6), **DWB** (M06.22 M886ae). Also its: **Gidrologicheskie, gidrokhimicheskie, geologicheskie i biologicheskie issledovaniia, dizel'-elektrokhod "Ob'," 1955–1956.** [Hydrological, hydrochemical, geological and biological studies, Research ship "Ob," 1955–1956.] Leningrad, Gidrometeoizdat, **1958.** 218 p. figs., numerous tables. Each vol. has added t-p in English. At head of t-p for each vol.: Mezhdunarodnyĭ Geofizicheskiĭ God. Trudy Kompleksnoĭ Antarkticheskoĭ Ekspeditsii Akademii Nauk SSSR. **DLC** (GC461.M6)—The preliminary oceanographic, actinometric, geological and meteorological results of the 33,000 mi first voyage (1955–1956) of the "Ob" to Mirny in the Antarctic, and back to Kaliningrad are set forth in detail in a dozen separate chapters of the first volume of the series, each written by one or more scientists. During the 16,000 mi cruise in Antarctic and Indian Ocean waters from Feb. 29 to June 8, 1956 (Mirny to Aden by way of New Zealand), 156 deep water oceanographic stations were occupied, and the physical oceanographic results (currents, waves, optics, ice, etc.) are presented in Ch. V (p. 48–90) by V. V. Shuleĭkin and others and the hydrochemical work in Ch. VI (p. 91–102). The main meteorological results are summarized in Ch. IV (p. 35–47) by L. G. Sobolev and R. F. Usmanov, including a well analyzed Southern Hemisphere synoptic chart for April 25, 1956, time cross sections, data on frequency of weather elements by latitude-longitude squares, frequency of winds aloft up to 20 km in January, March and May 1956 at Mirny, frequency of surface winds in coastal regions of Antarctica, etc. Methods of radiosonde, pilot balloon and surface observations are described, and frequency of observations on the "Ob" are tabulated .The entire work contains a large number of graphs, cross sections, charts showing locations of "stations," tables of data with depth, etc. The final results will be in even greater detail. The volume on the aerological and meteorological observations gives *in extenso* the periodic (4 hourly) surface observations from Dec. 10, 1955 to June 26, 1956, including wave and sea ice observations as made on board the "Ob" enroute from Kaliningrad—the Antarctic (Jan. 5), Mirny (Feb. 29), Wellington (April 9), Adelaide (April 21), Davis Sea (May 13), Port Said (June 15) and Hamburg (June 26)—a total of 1219 meteorological observations plus the results of 182 radiosonde and 244 pilot balloon observations on the same expedition. In addition, a supplement (No. 1) gives the meteorological data for the Mirny Station for the period March 1 - May 31, 1956 and for the "Lena" for Jan. 10–19, 1956 while on the oceanographic cruise from 39°S 12°E to 66.6°S 93°E. The "extenso" publication of oceanographic data obtained on the 150 stations occupied on the cruise of the "Ob" from Feb. 29, 1956 to June 8, 1956 is presented in the third volume of the series. The hydrological and hydrochemical observations (p. 7–145) include a description of the methods and instruments used for deep water observations, the wave observations, the optical observations, the hydrochemical observations and the tabular data for the current measurements, visual wave observations, graphic wave observations and the hydro-optical observations as well as

the hydrological and hydro-chemical observations. Maps and tables show location of stations—Number 107 reached 4350 m depth. (*Same item as* 11.1–8, Jan. 1960, *MAB.*) *Subject Headings:* **1. Oceanographic expeditionary data 2. "Qb" Expedition, 1955–1956 3. Antarctic meteorological data 4. Antarctic radiosonde data 5. Soviet Antarctic IGY expeditions 6. Indian Ocean 7. Mirny, Antarctica 8. Antarctica. I. Bardin, Ivan Pavlovich** (*ed.*) **II. Akademiia Nauk SSSR.**—*M.R.*

11A–72 551.46(265/266)

*†Muromtsev, Alekseĭ Mikhaĭlovich, **Osnovnye cherty gidrologii Tikhogo okeana.** [Basic features of the hydrology of the Pacific Ocean.] Leningrad, Gidrometeoizdat, **1958.** 629 p. 88 figs., numerous tables (p. 303–631), 200 refs. At head of t-p: Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby . . . Gosudarstvennyĭ Okeanograficheskiĭ Institut. **DLC** (GC286.M85)—A magnificent analysis and compilation of all available oceanographic or hydrographic data for the Pacific Ocean obtained between 1804 and 1955. Time and space variations of temperature, salinity, density and oxygen content, and their vertical distributions or gradients are analyzed. Water masses and circulation factors of the Pacific are also analyzed. Only data for the open Pacific (not the bordering seas) are compiled. The first 300 (large) pages consist of text, selective analytical tables, charts and cross sections, and an excellent bibliography of Russian and western literature on all aspects of Pacific oceanography. The last 330 pages consist of extensive tables of the above named elements by ocean squares and depths, with dates of expedition cited in each case. A catalogue giving in detail the names, dates, country, depths and elements observed on several hundred expeditions, arranged by ocean squares, is found on p. 36 to 101. Data are compiled by machine wherever possible. Measurements made in period 1804–1873 are catalogued separately. Separate chapters cover: 1) History of oceanographic surveys of Pacific; 2) Sources and methods of statistical compilation; 3) Temperature; 4) Salinity; 5) Density; 6) Oxygen content; 7) Classification of water masses; 8) Circulation scheme of Pacific. Appendix I is the data, and Appendix II an atlas of vertical cross sections and charts of temperature, salinity, density and oxygen content. Most of the surveys were made by U. S., British or Japanese vessels, but much of the systematic data is from the expeditions of the "Vitiaz" in 1951–55, especially, to great depths in the North Pacific. (*Same item as* 10.7–29, July 1959, *MAB.*) *Subject Headings:* **1. Oceanography of Pacific Ocean 2. Oceanographic data, Pacific Ocean 3. "Vitiaz" expeditions, 1951–1955 4. Pacific Ocean.**—*M.R.*

11A–73 551.578.41

*†Nakaya, Ukichiro, **Snow crystals; natural and artificial.** Cambridge, Harvard Univ. Press, **1954.** 510 p. 188 plates, 514 figs., 39 tables, bibliog. p. 312–314. **DLC** (QC929.S7N2)—This is a monumental piece of work (based on over 20 years of research) which fortunately was reproducible even though the original plates were completely destroyed in 1946. It differs from BENTLEY'S famous work in that it is arranged like a textbook, with chapters and text compiled in logical order, in addition to the hundreds of excellent microphotographs of snow crystals which illustrate the 100 odd subjects dealt with in the sub-sections of the book. The 8 major divisions of the text, or chapters, cover: 1) Observations, photomicrography, etc. of various types of ice crystals, snow and graupel; 2) Classification of snow crystals and frequency of occurrence of each type; 3) Physical properties of snow crystals (form, mass, rate of fall, change); 4) Artificial production of frost crystals and 5) of snow crystals; 6) Investigation of physical properties of artificial snow; 7) Comparison of natural and artificial snow crystals; 8) Recent (post-war) research on snow crystals and ice nuclei in the atmosphere and laboratory. An appendix gives the International Snow and Ice Commission Classification of snow crystals for practical purposes, a bibliography of 10 publications from *Hokkaido University, Faculty of Science, Journal* from 1933–1938 which comprises most of the contents of this book, and 90 other references. Finally, there are >1400 large, beautiful photomicrographs of snow crystals of every conceivable type, with emphasis on structure rather than form. A name and a subject index assist the reader in locating particular information. The last chapter contains references to the 1949–52 publications of SCHAEFER, AUFM KAMPE and WEICKMANN, HOUGHTON and other workers in the field of cloud physics. It points out that the work of SCHAEFER does not duplicate that of the author or vice versa, as the former deals with artificial formation of ice nuclei whereas the latter deals with artificial formation of snowflakes in the more mature stage. The special cold chamber 6 m × 6 m × 6 m with controlled humidity and temperature (down to −50°C), constructed in 1953, gave the author the opportunity to produce the "first artificial snowflake" and to reproduce all the forms found in nature and some which had not yet been discovered until after the artificial form had been produced. It is concluded that the form of crystal is dependent on temperature (in nature, upper air temperature) as the vapor pressure difference is strongly dependent on temperature and vapor pressure difference is the real controlling factor. All of the work presented is supported by exhaustive quantitative data in statistical or graphical form. (*Same item as* 6.1–3, Jan. 1955, *MAB.*) *Subject Headings:* **1. Snow crystals 2. Cloud physics.**—*M.R.*

11A–74 551.5(02)(09)

†Neis, Bernhard, **Fortschritte in der meteorologischen Forschung seit 1900.** [Progress in meteorological research since 1900.] Frankfurt a.M., Akademische Verlagsgesellschaft, **1956.** 238 p. figs., ports., tables, eqs. bibliog. at end of each ch. **DWB.** Review by C. E. P. Brooks in *Royal Meteorological Society, Quarterly Journal,* 38(356):282, April **1957.**—This book is the outcome of a series of lectures given by the author (who died May 24, 1956 at age 74) during the winter of 1953/54 at the Berlin Freie Univ. The vast literature of a physical or quantitative nature is systematically reviewed for the period 1900–1956. The approach is by subject areas rather than chronological. The paths of development beginning with the general or basic scientific situation in research at the turn of the century is covered and the author goes on to discuss the increased understanding of the upper atmosphere resulting from balloon soundings, radiosondes and thermodynamic diagrams; the colloidal physics of the atmosphere, upper air, synoptic charts and research arising from extended networks of sounding stations, aerological analysis; wind and turbulence concepts; radiation measurements and knowledge of radiative balance, theory of the stratosphere and radiation inversions, kinetics of wind, friction; dynamic waves in the atmosphere; vorticity and energy transport, role of water vapor phase; electric, magnetic and auroral phenomena; general circulation models and meridional transport of energy, grosswetter types; forecasting and practical meteorology and, finally, climatology, agricultural meteorology, phenology, microclimatology, health resort climatology or bioclimatology. Representative literature or works from various countries are cited but the bulk (50–70%) of the research reported is by Germans or from German sources. A good name and a subject index is appended. A few line drawings or diagrams and photographs of 12 outstanding meteorologists constitute the illustrative material. Several fields of progress are not touched on at all: e.g., cloud seeding and cloud physics research in the U. S., extended and long range forecasting research of NAMIAS and associates, climatic changes, radar storm or precipitation detection, detailed studies of the albedo of different surfaces, etc. (*Same item as* 8.8–17, Aug. 1957, *MAB.*) *Subject Headings:* **1. Progress in meteorology 2. History of meteorology 3. Biographical material 4. Textbooks.**—*M.R.*

11A–75 551.5:061.1(492)(09)

†Netherlands. (K.) Meteorologisch Instituut, **Koninklijk Nederlands Meteorologisch Instituut, 1854–1954.** [The Netherlands Meteorological Institute, 1854–1954.] 's-Gravenhage, Staatsdrukkerijen Uitgeverijbedrijf, **1954.** 469 p. numerous figs., including ports. and colored plates; tables, eqs., refs. List of publications of the Meteorological Institute, p. 448–461. **DLC** (QC875.N38), **DWB.** Review by BLEEKER, W., **The Royal Netherlands Meteorological Institute (1854–1954).** *Nature,* London, 174(4422):203–204, July 31, **1954.**—Memorial volumes in honor of some famous scientist are occasionally published in one country or another. Sometimes these volumes are quite elaborate. Here is a work dedicated to the 100th anniversary of an institution—the first of its kind for a meteorological service, and a most elaborate and satisfactory volume even for those who cannot read the language. The large volume consists of 3 parts: The first part is mainly historical, consisting of chapters on the general history of meteorological services and the Netherlands service (K.N.M.I.) in particular, the influence and work of BUYS-BALLOT (1854–90), the period of slow development (1890–1940) and the turbulent period of the war and rapid post-war development (1940–1954), the two International Polar Years (1882–83 and 1932–33), the role of the K.N.M.I. in the International (World) Meteorological Organization, etc. Pt. II consists of a series of articles on the various services and departments of the K.N.M.I.: 1) Instruments, 2) Aviation meteorological service, 3) Climatology and agricultural meteorology, 4) Maritime meteorology, 5) Physical oceanography, 6) Geophysics, and 7) Library and publications. Pt. III consists of 10 first class scientific papers by members of the K.N.M.I. scientific staff: H. J. A. VESSEUR, H. P. BERLAGE, H. C. BIJVOET, W. VAN DER BIJL, C. LEVERT, S. W. VISSER, R. DORRESTEIN, G. VERPLOEGH, and J. G. J. SCHOLTE, and an appendix giving (a) a list of the members of the College of Curators (1899–1954), and (b) of the principal members of the staff of K.N.M.I. (1854–1954) including 7 chiefs and 26 directors, etc. and (c) 136 publications of members of the K.N.M.I., etc. (*Same item as* 5.10–7, Oct. 1954, *MAB.*) *Subject Headings:* **1. Netherlands Meteorological Service 2. History of meteorology. I. Buys-Ballot, C. H. D. II. Bleeker, W.**—*M.R.*

11A–76 551.510.62:621.396(931)

§*New Zealand. Dept. of Scientific and Industrial Research, **Report of factual data from the Canterbury Project. A radio-meteorological investigation in the South Island of New Zealand.** London, Pub. by the Dept., **1951.** 3 vol. (857+283+187 p.), figs., tables, graphs, refs. Vol. 2–3 oversize. **DLC** (QC973.G7), **DWB**—These three large volumes comprise the final report, including all of the data, charts and analyses of a joint scientific investigation conducted between Sept. 1946 and Dec. 1947 by the Dept. of Scientific and Industrial Research of the United Kingdom and of New Zealand. The "Canterbury Project" was planned in 1944 to provide information on the formation and behavior of low level atmospheric ducts caused by advection of warm dry continental

air over the neighboring sea. An area in Canterbury Province of South Island, New Zealand, was considered the most suitable. Vol. I, **Descriptive and numerical data,** contains an analysis of all of the meteorological and radio data collected during this period and all of the detailed surface, upper air, synoptic and oceanographic data for the entire area around New Zealand. Airplanes, radar, balloons, radiosondes and ship observations were used intensively and extensively. Each separate situation is described and analyzed. Surface synoptic observations are given for 00, 03, 06, 09, 12, 15 and 18h for a score of stations. The observational, operational and theoretical considerations are also treated at great length and in detail. Vol. II, **Meteorological data,** consists of a large "atlas" type presentation of graphs and charts prepared from the meteorological data collected during this survey. A detailed topographical map of the region and a cross section showing the relief in relation to observation stations is followed by detailed isopleth and sounding diagrams of potential temperature, specific humidity, temperature and upper air winds for levels from sea level to 2000 ft height. Actual anemograph traces for the 50 ft level are reproduced for several stations for each of the 50 or so situations studied. Synoptic charts are presented for 1200h local time for the Australian region for all of the periods when data were obtained. Isopleth cross sections of potential temperature and specific humidity are given in great detail for a range of 25 mi of land and 120 mi at sea (to 1000 ft). Soundings are given for both land and sea. Vol. III, **Radio-wave propagation data,** also consists of large detailed graphs and isopleth cross sections of modified refractive index, height gain curves, etc. from aircraft and ship soundings from 0 to 1000 or 2000 ft height. About 50 separate situations are thoroughly analyzed in this fashion. (*Same item as* 4.3–11, March 1953, *MAB.*) *Subject Headings:* **1. Radiometeorological investigations 2. Radio wave propagation 3. Tropospheric radio wave propagation 4. Radio wave transmission ducts 5. Canterbury Project 6. South Island, New Zealand. I. Great Britain, Dept. of Scientific and Industrial Research.**—*M.R.*

11A–77 551.593.51

*§†O'Connell, D. J. K., **The green flash and other low sun phenomena.** With photos, 80 in color, by C. Treusch. (Castel Gandolfo), Vatican Observatory; New York, Interscience Publishers, **1958.** 192 p. numerous figs., tables, 313 refs., 80 photos (in color). **DLC** (QC976.C6O23). Review by Charles H. Smiley in *Science,* 129(3357):1218–1219, May 1, **1959.**—A most thorough and scholarly study of the history and theory, observation and appearance of the green (blue and red) flash, which appears just at sunrise or sunset (or on rim of moon or Venus) with scores of excellent color photographs and the associated observational data (including radiosonde and synoptic charts) and annotations, bound in an elegant volume. Ch. I covers the history, with ample bibliographic citations; Ch. II, theory (physiological, anomalous dispersion, atmospheric dispersion, selective absorption in atmosphere, Rayleigh scattering, absorption and scattering into dust and haze); Ch. III, factors that influence the green flash (duration, intensity, mirage effects, scintillation, color, distortion) and Ch. IV, the Vatican Observatory photographs (telescope, film and development, exposure times, color movies at sunset, artificially produced green flash, reproduction techniques, etc.) The catalog of color and black and white photos is arranged in 3 sections: A) the green rim (16 photos), B) the green segment with green flash (10 photos) and C) the green and red flash influenced by discontinuity layers (18 plates). An extensive bibliography, and subject and author indexes are appended. The color photographs made by C. Treusch, S. J., at the Vatican Observatory, while not the first ever made, are the first ever published. They show definitely that the phenomenon is not subjective as was held by early observers, for the greens (and blue and red tinges) are vividly portrayed in many instances for the sun and for the moon and Venus as well. (*Same item as* 10.5–7, May 1959, *MAB.*) *Subject Headings:* **1. Green flash 2. Green flash photographs 3. Green flash bibliographies. I. Treusch, C.**—*M.R.*

11A–78 551.5(09)

†Okada, T., **Sekai Kishogaku Nenpyo.** [Chronology of weather science.] Rev. by H. Arakawa. Tokyo, Chizin Shokan Co., **1956.** 229 p. figs., ports., tables.—An unusually thorough and imaginative chronological history of meteorology from 1442 to 1956 with a 24-page systematic summary and with separate discussion of events of importance year by year. Although the text is all in Japanese, the references to authors and publications from western sources give a clue to the events that Okada and Arakawa consider outstanding for each year included in the chronology. There are one or more entries for nearly every year from 1870 to 1956. Photos of many famous people, including recent workers such as Rossby, H. Wexler, Palmén, Fultz, Norman Phillips and others are presented. Considerable emphasis is placed on publication events such as textbooks, compendiums, periodicals (e.g., *Meteorological Abstracts and Bibliography,* p. 218) and symposia. Data and diagrams are also included in appropriate places. Arakawa has revised Okada's work from 1941–1956. (*Same item as* 8.7–11, July 1957, *MAB.*) *Subject Headings:* **1. History of meteorology 2. Meteorological chronologies. I. Arakawa, H.** (*ed.*).—*M.R.*

11A–79 551.521.3(02) 551.593(02)

*†Piaskovskaia-Fesenkova, E. V., **Issledovanie rasseianiia sveta v zemnoi atmosfere.** [Investigations on light scattering in the earth's atmosphere.] Moscow, Akademiia Nauk SSSR, **1957.** 217 p. 106 figs., 65 tables, 104 refs., 172 eqs. **DLC** (QC976.T6P5). Summary in *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 12:1533–1534, **1957.**—A monographic text on every aspect of light scattering in the atmosphere: Ch. I covers basic concepts and determinations of (1) attenuation and (2) scattering. Ch. II takes up instruments and methods of observation: (1) photometry of the daytime sky, (2) coronal photometer, (3) effect of wave length, and (4) accuracy of measurements. Ch. III, Brightness of the daytime sky: (1) formula involving first order scattering, (2) observation of daytime sky brightness during clear skies, (3) theory of multiple scattering and comparison with observations. Ch. IV, Atmospheric indexes of scattering. Ch. V, Calculations of multiple scattering. Ch. VI, Criteria of stability of optical atmospheric characteristics. Ch. VII, Methods of determining the coefficient of extinction during clear skies. The theory is covered in detail in each chapter and supported by or compared with empirical data presented in scatter diagrams, curves, tables, etc. (*Same item as* 10.5–18, May 1959, *MAB.*) *Subject Headings:* **1. Atmospheric scattering 2. Atmospheric optics textbooks.**—*M.R.*

11A–80 551.510.41:546.214:535.33(02)

Prokof'eva, I. A., **Atmosfernyĭ ozon.** [Atmospheric ozone.] Moscow, Akademiia Nauk, **1951.** 231 p. graphs, charts, diagrs., tables, 213 refs. Price: 11 rubles, 50 kop. **DLC** (QC881.P7)—A systematically organized and technical monograph covering every aspect of: a) instrumentation, b) computation and c) interpretation of data on ozone in the atmosphere, based on work of Russian and foreign scientists from 1879 to 1950. The bibliography of 213 items (of which 58 are in Russian) covers most of the important literature up to 1949. (*Same item as* 3.4–9; 6B–104, *MAB.*) *Subject Headings:* **1. Ozone 2. Bibliography on ozone 3. Textbooks.**—*M.R.*

11A–81 551.583:581.056(793)

*†Schulman, Edmund (*Univ. of Arizona, Lab. of Tree-ring Research*), **Dendroclimatic changes in semiarid America.** Tucson, Arizona, Univ. of Arizona Press, **1956.** 142 p. 42 figs. (incl. photo), 87 tables, 93 refs. **DLC** (QC883.S37)—A major monographic compilation of facts and data on tree-ring analysis, rainfall records and their correlation, and on estimates of precipitation based on centuries old tree-ring records. The appendix contains an account of a recent discovery of pine trees at 10,000–11,000 ft elevation in the White Mountains of Nevada which indicates ages of 3000–4000 yrs or more for several trees—older than the famous Sequoia (3200 yrs) and more indicative of drought-rainfall conditions since they are in a more marginal area and are more sensitive to rainfall variation than are the Sequoia. The several major chapters of the work comprise: I. Introduction, II. Problems of analysis, III. The tree-ring as a climatic gage, IV. Growth indices and climatic changes, V. Summary. Appendix A gives sample chronologies from 13 basins in the West; B, Dendroclimatology in Patagonia; C, Millenia-old pines sampled in 1954 and 1955. (*See also* 6.5–281, May 1955, *MAB.*) (*Same item as* 8.3–13, March 1957, *MAB.*) *Subject Headings:* **1. Dendroclimatology 2. Climatic changes 3. Rocky Mountains 4. White Mountains, Nev.**—*M.R.*

11A–82 551.5(09) 551.5:92

†Schneider-Carius, Karl, **Wetterkunde, Wetterforschung: Geschichte ihrer Probleme und Erkenntnisse in Dokumenten aus drei Jahrtausenden.** [Meteorology, weather research: history of its problems and concepts in documents through 3000 years.] Freiburg, Karl Alber, **1955.** 423 p. figs., tables, refs. (by chapter), p. 356–367. Bibliography, p. 368–398. Biographical data (on meteorologists), p. 399–414. (*Orbis Academicus*, Vol. II/9, Freiburg.) **DLC** (QC855.S35)—An excellent reference work and source book for anyone interested in the history of meteorology and its various branches, from the earliest days to 1953, inclusive. It would be impossible to list the numerous specific subjects that are treated chronologically in each of the 35 sections (arranged under 5 major chapter headings). The textual material consists mainly in a series of synopses of developments in each field, followed or interspersed with quotations from the original sources, of which there are over 400, some a page or more in length, and all (unfortunately) translated into German. Not much illustrative material is reproduced, but citations are numerous and accurate and lead one to the best of the world's meteorological literature since publication began. There are 3 separate lists of references: first, a list of sources numbered consecutively by chapters; second, a complete bibliography of nearly 1000 references, including original titles, etc., arranged chronologically in each of 23 headings: 1. History of meteorology, 2. Textbooks and 3. Collected works, 4. Structure and composition of atmosphere, 5. Atmospheric electricity, 6. Optics, 7. Radiation, 8. Heat exchange, 9. Weather elements, 10. Thermodynamics, 11. Hydrologic cycle, 12. Dynamic meteorology, 13. Micrometeorology, 14. Advective processes, 15. Atmospheric tides, waves and oscillations, 16. General and local circulation, 17. Small scale weather, 18. Large scale weather, 19. Air masses and frontal theory, 20. Forecast methods, 21. Climatology, 22. Grosswetter and 23. Energetics; and third, a

biographical register of about 320 authors, arranged alphabetically, and with brief notes as to birth, death, position and main contributions. Then an author index and, finally, a subject index of over 500 subjects. One might note that there is not one single equation in the book, that only 2 or 3 of the authors mentioned were Russian, that French, American and British authors are placed in proper perspective, and that German authors, naturally, predominate. (*Same item as* 6.7–5, July 1955, *MAB.*) *Subject Headings:* **1. History of meteorology 2. Biographies of meteorologists.** —*M.R.*

11A–83 551.583:007

†Shapley, Harlow (*ed.*) (*Harvard Univ.*), **Climatic change: evidence, causes, and effects.** Cambridge, Mass., Harvard Univ. Press, **1953.** 318 p. numerous figs. and tables, bibliog. at end of each ch. Price: $6.00. **DLC** (QC981.S5). Transl. into Russian, ed. by I. M. Sheĭnisa and S. Iu. Geller, with title **Izmenenie klimata,** issued Moscow, Izdatvo Inostrannoĭ Literatury, **1958.** 358 p. figs., table, bibliogs.—The twenty-two papers constituting this book were delivered originally at a conference on climatic change and climate and life held at the American Academy of Arts and Sciences in Boston in May 1952. These contributions can be classified into the following broad fields: astronomy (6), geology and geography (3), meteorology (4), paleontology (4), paleoanthropology (2), geophysics (1), geochemistry (1) and a general paper by the editor summarizing the various papers and discussing the origin of life and the conditions for its appearance and existence. Each of these papers has been abstracted separately. (*Same item as* 5.11–183, Nov. 1954, *MAB.*) *Subject Headings:* **1. Climatic changes 2. Climate and man. I. Sheĭnisa, I. M.** (*transl.*) **II. Geller, S. Iu.** (*transl.*).—*I.L.D.*

11A–84 551.5:016

†Shaw, Sir William Napier, **Selected meteorological papers.** London, Macdonald, **1955.** port., figs., tables, refs., eqs. throughout. Bibliography, compiled by E. E. Austin and Joan Williams, of 381 items, arranged chronologically. **DLC** (QC852.S5), **DWB.** Review by R. C. Sutcliffe, in *Royal Meteorological Society, Quarterly Journal,* 81(349)527, July **1955.**—This beautiful memorial volume contains a selection from the lectures, addresses, essays and scientific articles of Sir W. Napier Shaw, which are either out of print or not readily accessible. The contents are as follows: Life history of surface air currents; Study of the surface trajectories of moving air; Law of sequence in the yield of wheat for eastern England; Meteorology and wheat shortage; Barometric gradient and wind force; Variations of currents of air indicated by simultaneous records of the direction and velocity of the wind; Beaufort scale of wind force; Hints for meteorological measurement; Principia atmospherica; Study of the circulation of the atmosphere; Travel of circular depressions and tornadoes and the relation of pressure to wind for circular isobars; Birth and death of cyclones; Convective energy of saturated air in a normal environment; Note on the graphic representation of pressure and temperature obtained from observations by balloons, aeroplanes or kites; Book of the grower's year, and March of meteorology. The book also contains a portrait of Sir Napier and a bibliography of his works. (*Same item as* 7.1–2, Jan. 1956, *MAB.*) *Subject Headings:* **1. Collected works of Sir William Napier Shaw 2. Meteorology bibliographies. I. Austin, E. E.** (*comp.*) **II. Williams, Joan** (*comp.*).—*I.L.D.*

11A–85 551.501.3:53.081

*Smithsonian Institution, **Smithsonian physical tables.** 9th rev. ed. prepared by William Elmer Forsythe. *Smithsonian Miscellaneous Collections,* Vol. 120, **1954.** 827 p. 901 tables. **DWB, DLC** (Q11.S7)—Considering the comprehensiveness of the **Smithsonian meteorological tables** (*see* 2D–35 and 11A–4, *MAB*) it is at first glance hard to see how these **Physical tables** could have much value for a meteorologist. But on closer scrutiny it can be seen that such tables as those on black body radiation energy, photometry, thermodynamics, thermal properties of gases, acoustics, optics, aeronautics (standard atmosphere, airflow, etc.), diffusion, vapor pressure, surface tension, radio propagation, ionosphere, transmission of radiation, spectroscopy, atmospheric electricity, nuclear physics, cosmic rays, X-rays, solar radiation, astrophysics, oceanography and earth temperatures, to name only a few categories of the wealth of subject matter contained in the 901 tables of this 9th rev. ed., are of extreme value for the physical or practical meteorologist. (*Same item as* 6.1–6, Jan. 1955, *MAB.*) *Subject Headings:* **1. Physical tables 2. Physical constants 3. Physical meteorology. I. Forsythe, William Elmer.**—*M.R.*

11A–86 551.5(09)

*Spasskiĭ, Mikhail Fedorovich, **Izbrannye raboty po fizike atmosfery.** [Selected works on the physics of the atmosphere.] Ed. by A. Kh. Khrgian. Moscow, Izdat. Tekhniko-Teoreticheskoĭ Literatury, **1951.** 342 p. figs., 49 tables, foot-refs., eqs. **DLC** (QC852.S65)—This collection of historical Russian papers contains an introductory article by A. Kh. Khrgian on **Geophysical research of Russian scientists of the 18th and 19th centuries,** p. 9–49; one by A. F. Kononkov on the

Life and works of P. I. Strakhov, 1757–1813, p. 50–69; another by Khrgian on the **Life and works of M. F. Spasskiĭ, 1809–1859,** p. 70–90; and in the body of the text, selected works on physics of the atmosphere: Strakhov, P. I., **O svoĭstvakh vozdukha** [On properties of air], p. 94–107; Spasskiĭ, M. F., **O klimate Moskvy** [On the climate of Moscow], p. 108–283; and Spasskiĭ, M. F., **Rech ob uspekhakh meteorologii** [Progress in meteorology], p. 284–332. Appended are notes of the editor, giving biographical and other information about authors and works mentioned in the text (p. 333–342). The work on the climate of Moscow, published in 1847 by the Moscow Univ. Press, is one of the most analytical treatments of temperature of a locality (based on records from 1820–1846) ever published. Monthly, seasonal, annual, 5-year and decadal means are compared with normals of two periods, 1820–33 and 1834–46 and for the entire 26 years. Records for 1780–1792 obtained during collaboration with the Meteorological Society of the Palatinate, are also compared with 1820–1846 records. In Pt. 2, precipitation, snow, barometric pressure, wind (data for temperature and pressure wind roses are also given) and other factors are analyzed and in Pt. 3 the "causes" of the climate of Moscow are analyzed and comparison is made with other European and Siberian stations with long records. (*Same item as* 7.10–2, Oct. 1956, *MAB.*) *Subject Headings:* **1. History of meteorology 2. Climate of Moscow 3. Biography of M. F. Spasskiĭ 4. Biography of P. I. Strakhov 5. Moscow. I. Khrgian, A. Kh.** (*ed.*).—*M.R.*

11A–87 551.582.3(485)

*Svenska Sällskapet för Antropologi och Geografi, Stockholm, **Atlas över Sverige.** [Atlas of Sweden.] Ed. by Magnus Lundqvist, Carl Julius-Anrick et al. Printed by Kartografiska Institutet, Stockholm, issued by the Generalstabens Litografiska, Anstalts Förlag [of Sweden], Stockholm, **1953.**—Issued in sections. 44 cm. Section 25–26, Ångström, Anders: **Temperatur, humiditet.** [Temperature, humidity.] 7 p. 6 figs., table, 16 maps (in color). English summary p. 6–7. Section 29–30, Wallén, C. C., **Nederbörd.** [Precipitation.] 5 p. 2 figs., 16 maps (in color). English summary p. 5. **DWB** (M82.3 A881), **DLC** (G2070.S8 1953, Map Div.)—Monthly charts for Sweden of mean temperature for 1901–1930, and charts showing difference between mean temperature in Jan. and July, the coldest Jan. or Feb. during 1901–30, the hottest July (1901–30) and the relative humidity during the vegetation period are presented in many colors. Histograms show monthly temperature and precipitation at 18 stations in Sweden. Curves showing smoothed annual temperature regime for each degree of latitude from 55° to 69°N, charts showing temperature anomalies for June and Dec., etc., are included along with ample text describing the climate, temperature and humidity regime in Sweden. Each chart is annotated. A table shows temperatures and precipitation at a number of places around the world having the same latitude as Sweden. (*Same item as* 8.9–15, Sept. 1957, *MAB.*) *Subject Headings:* **1. Climatic atlases 2. Temperature data 3. Sweden. I. Lundqvist, Magnus** (*ed.*) **II. Julius-Anrick, Carl** (*ed.*) **III. Ångström, Anders IV. Wallén, C. C.**—*M.R.*

11A–88 551.582(99)

*†Tauber, G. M., **Osnovnye cherty klimata i pogody.** [Basic characteristics of climate and weather (of the antarctic).] *Moscow. Gosudarstvennyĭ Okeanograficheskiĭ Institut, Antarktika,* Vol. 1, **1956.** 146 p. 29 figs. (some fold.), 37 tables, 148 refs. **DWB** (919.9 U581an), **DLC** (GB397.M6)—This book is the first real analysis and synthesis of all available meteorological data for the Antarctic since the 1938 compilation of MEINARDUS in the **Köppen-Geiger Handbuch.** The work is based on data and information contained in about 150 publications, 56 of which are from Russian sources. The main sections of the book deal with: 1) Physico-geographic factors, 2) Climatic controls, 3) Atmospheric circulation in the Antarctic seas, 4) Climatic conditions of the Antarctic, 5) Climatic and weather conditions in the vicinity of the Antarctic seas, 6) Aerological characteristics of Antarctica. The basic climatic data are for periods of varying length from 1898–1935, but the aero-synoptic analyses make use of the results of more recent (up to 1955) expeditions and publications. (*Same item as* 8.3–12, March 1957, *MAB.*) *Subject Headings:* **1. Climate of Antarctica 2. Antarctic weather 3. Antarctic seas 4. Antarctica.**—*M.R.*

11A–89 551.582.3(71):72

*Thomas, Morley K. (*Toronto Met. Div.*), **Climatological atlas of Canada.** A joint publication of the Division of Building Research, National Research Council, and the Meteorological Division, Department of Transport, Canada. *National Research Council of Canada. Div. of Building Research, D. B. R.*, No. 41, Dec. **1953.** 253 p. tables, numerous charts and graphs, 11 refs. Price: $2.00. Also issued as *National Research Council of Canada, N. R. C.* No. 3151. **DWB**—Charts and tables of meteorological conditions all over Canada (44°–80°N) are presented for use in other fields as well as in building research. Major elements included are: Winter design temp., Summer design temp., Humidity, Wind, Snow, Rain, Sunshine, Permafrost, Earthquakes and "Hythergraphs." Design temps. are on a 1, 2½, 5 and 10% basis, and are based on hourly temps. at 35 locations in Canada. Wind data include computed maximum gust speed, mean seasonal wind speed

and direction frequencies of winds. Snow includes maximum depth on ground, maximum snow, frost, mean annual and monthly snowfall. Isolines are in blue on an orange base, and represent means or frequency categories. (*Same item as* 6.11–92, Nov. 1955, *MAB.*) *Subject Headings:* **1. Climatic atlases 2. Building design data 3. Canada. I. National Research Council of Canada.** —*M.R.*

11A–90 551.515.21(08)

Tropical Cyclone Symposium, Brisbane, Dec. 10–14, 1956, **Proceedings.** Melbourne, Director of Meteorology, Dec. **1956.** 436 p. figs., tables, refs. **DWB**—Over 30 papers by 65 participants from countries at the conference held at Prisbane in Dec. 1956 are presented in a fine edition arranged according to the special sessions under the following headings: 1) The occurrence of tropical cyclones, 2) Methods of analysis and forecasting, 3) Structure, 4) Modern methods of detection, 5) Formation and development, 6) Movement, 7) Aircraft reconnaissance, 8) Sea disturbance associated with cyclones, and 9) Trends in forecasting. Each session's papers are followed by a discussion by numerous participants. The first paper in each session comprised a review of the present status and progress in that special field. (For listing of contents, *see* Pt. III, p. 1016, July 1957, *MAB.* Individual articles abstracted separately.) (*Same item as* 9.1–4, Jan. 1958, *MAB.*) *Subject Headings:* **1. Tropical cyclone symposia 2. Tropical cyclone research. I. Australia. Bureau of Meteorology.**—*M.R.*

11A–91 551.582.3:551.576.1

U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby, **Atlas oblakov.** [Cloud atlas.] Leningrad, Gidrometeoizdat, **1957.** 2 pts., laid in folder. (Pt. 1), Text. 65 p. 5 figs., chart (fold.). (Pt. 2), 131 photos (some in color). **DLC** (QC921.R87). Reviews by V. M. Skliarov and R. I. Novozhilov in *Meteorologiia i Gidrologiia*, Leningrad, No. 3:59–64, March **1958.**—A new and original cloud atlas and instruction manual consisting of 131 large (many colored) cloud photographs made in the Soviet Union—emphasizing the unusual forms found in mountains, over the sea or observed from airplanes. Special forms such as condensation trails from aircraft, waterspouts, dust and sand storms or squalls, fog, rotor clouds, banner clouds, etc. are included. The text discusses the classification and recording of clouds, cloud systems, development of clouds, local indication of water from clouds, special forms of clouds over mountain and sea. A glossary of Latin names with Russian equivalents is included. Also, a chart for cloud identification is folded in. (*Same item as* 9.10–33, Oct. 1958, *MAB.*) *Subject Headings:* **1. Cloud atlases 2. Cloud observation manuals 3. U.S.S.R.**—*M.R.*

11A–92 551.582.3:551.587(26)

*U. S. Office of Naval Operations, **U. S. Navy marine climatic atlas of the world.** Issued 1955– as its *NAVAER.* Vol. 1, **North Atlantic Ocean,** issued Nov. 1, **1955.** Vol. 2, **North Pacific Ocean,** issued July 1, **1956.** Vol. 3, **Indian Ocean,** issued Sept. 1, **1957.** Vol. 4, **South Atlantic Ocean,** issued Sept. **1958.** (Its *NAVAER* 50-1C-528 through 50-1C-531, respectively). Vol. 5, **South Pacific Ocean** in press, to be issued **1960.** Each vol. has about 17 p. introductory text and about 270 charts each (in color) 50×34 cm. **DWB** (M82.3 U585m)—In each of these handsome atlases, monthly charts of surface and upper air parameters for the oceans are presented, being compiled by machine from raw observational data. Wind roses and isopleths of mean values and frequency distributions of surface winds, gales, precipitation, ceiling, visibility, cloudiness, wind-visibility-cloudiness, temperature, wet bulb, dewpoint, air-sea temperature difference, temperature and wind speed, seasonal charts of 850, 700, 500, 300 and 200 mb, winds (aid and retard), temperature, humidity and heights of pressure surface, height of tropopause and freezing level, potential aircraft icing frequencies, modified refractive index, inversions, paths of tropical and of extratropical cyclones, etc. are included. Charts show meticulous and excellent draftsmanship. In many cases the raw data are presented in tabular form on the charts in their appropriate locations (ocean area, station or island). Ample textual information and annotations of the charts provide the aerologist or oceanographer with facts about radiosonde stations, ocean weather stations, length of record, methods of compilation and use of charts and references to sources of literature or data. (For fuller abstracts, *see* 8.5–81, 8.9–13 and 9.11–29, *MAB.*) *Subject Headings:* **1. Marine climatic atlases 2. Upper air frequency charts 3. North Atlantic 4. North Pacific 5. Indian Ocean 6. South Atlantic 7. South Pacific.**—*M.R.*

11A–93 551.582.3(261)

*†U. S. Weather Bureau and U. S. Hydrographic Office, **Climatological and oceanographic atlas for mariners, Vol. 1, North Atlantic Ocean.** Wash., D. C., Govt. Print. Off., Aug. **1959.** 7 p. of text. 182 charts, 55 refs. Price: **$2.25. DWB, DLC** (G1046.C7U5 1959)—As in the U. S. Office of Naval Operations, **U. S. Navy marine climatic atlas of the world** (*see* 11A–92), the data presented here in-

volved several million ship observations, supplemented by records at selected coastal stations, and reduced to several series of monthly or seasonal isopleths, bar graphs, roses, etc., representing the long-period distribution of the elements observed. The major portion of the climatological section has, in fact, been adapted from the above mentioned **Marine Climatic Atlas, Vol. 1, North Atlantic Ocean.** The remaining materials have been adapted largely from recent Weather Bureau publications and from publications and special data files of the Hydrographic Office. The climatological charts contain the following information: frequency of liquid and frozen precipitation; surface wind roses, with isolines of the frequency of gales; mean height of the 500 mb surface, with 500 mb wind roses; tropical storm "roses" (frequency, speed and direction of movement) derived from trajectories in *U. S. Weather Bureau, Technical Paper*, No. 36, **1959**; frequency of visibilities <5 n.m., frequency of total cloud amount $\leqslant 2/10$, $\geqslant 8/10$; 5, 25, 75 and 95 percentile values of pressure and temperature, with mean isobars and isotherms; mean dew point; low pressure center roses (frequency, speed, direction), by 10-degree squares, based on daily map analyses for 1924–38; and mean air-sea temperature difference. The oceanographical charts include maps of cotidal and corange lines; surface currents; wave height roses, with wave period data; ice cover and location of icebergs; expectancy of ship superstructure icing (based on wind and temperature data); distribution of biological fouling and of marine borers; water density; sea surface temperature; and finally, a series of charts titled "immersion hypothermia," showing expected survival times according to the areal distribution of mean sea surface temperature. The charts extend into east Europe, data being presented in most cases as far east as the Barents and Black seas. As in the **Marine Climatic Atlas,** where isopleths are not given, the data shown are representative of ocean squares or fixed ocean weather vessels. The number of observations involved in each compilation is given on the individual charts or may be estimated from figures given in the introduction; however, information on the times of surface observations or the number of observations per day is not included. *Subject Headings:* **1. Marine climatic atlases 2. Marine climatic data 3. North Atlantic.**—*R. S. Quiroz.*

11A–94 551.506.3:551.582.2

*U. S. Weather Bureau, **World Weather Records, 1941–1950.** Wash., D. C., **1959.** 1361 p. chart, almost entirely tables. "Continuation of three previous volumes of **World Weather Records,** published as Vol. 79, 90, and 105 of *Smithsonian Miscellaneous Collections*, containing data—1920, 1921–1930, and 1931–40," ed. by H. H. Clayton and F. L. Clayton." (For abstract on previous Records, *see* 5A–106, Jan. 1954, *MAB.*) "p. 97–102, Errata in previous volumes of **World Weather Records.**" Price: $4.75 from Gov't. Print. Off., Wash., D. C. **DLC** (QC982.W6), **DWB** (M06.1 U587wo)—Carefully homogenized records for 685 stations selected according to the **Réseau Mondial,** and as far as possible in continuity with Vol. 79, 90 and 105 of *Smithsonian Miscellaneous Collections* which cover up to 1920, 1921–30 and 1931–40, for pressure, temp., rainfall. Stations are arranged under 12 major divisions: Africa, Antarctica, Asia, Australasia, Europe, Indian Ocean, North America, North Atlantic, North Pacific, South America, South Atlantic and South Pacific. (For fuller abstract, *see* 11.1–32, this issue.) *Subject Headings:* **1. World weather records 2. Climatic data for world 3. Marine climatic data. I. Brooks, Charles F. II. Conover, John H.** (*ed.*) **III. World Meteorological Organization.**—*M.R.*

11A–95 551.5:016(68,267) 551.582.3(68,267)

†Venter, R. J. (*comp.*), **Bibliografie van meteorologiese streekliteratuur, Vol. 1, Suidelike Afrika 1486–1948.** Added title: **Bibliography of regional meteorological literature, Vol. 1, Southern Africa 1486–1948.** Pretoria, Union of South Africa, Weather Bureau, **1950.** Price: 21 s. 412 p. **DLC** (QC851.S83)—An excellently prepared, edited and bound volume containing 2900 references to articles or books on meteorology or climate of South Africa including Angola, British East Africa, Zanzibar, Tanganyika, Mozambique, southwest Africa, northern Rhodesia, Nyasaland, Madagascar, Mauritius, the South Atlantic and the western Indian Ocean arranged according to the Universal Decimal Classification. A classified index by the above regions, an author index, an outline of the U.D.C. scheme for meteorology in English and Afrikaans, and a tabulation of observational data available for each of these regions by type of data and chronological period, make this a most valuable reference. (*Same item as* 2.5–5, May 1951, *MAB.*) *Subject Headings:* **1. Bibliography of meteorology 2. Climatic data 3. South Africa 4. East Africa 5. Indian Ocean. I. South Africa. Weather Bureau.**—*M.R.*

11A–96 551.582.3(73)

*Visher, Stephen Sargent (*Indiana Univ.*), **Climatic atlas of the United States.** Cambridge, Harvard Univ. Press, **1954.** 403 p. 1031 charts. bibliog. p. 393–394. **DLC**(G1201.C8V5 1954), **DWB.** Review by Harry P. Bailey in *Science*, 121(3146):563, April 15, **1955.**—This is the first attempt at a climatic atlas for the United States in book form. It contains over 1000 charts, almost half of them original. A wealth of data on all of the usual meteorological elements has been analyzed

nd presented in visual form and with the lines boldly drawn so as to give a simple "bird's-eye view" f the rough distribution or variation in the elements, with little regard for topography. In a few ases the actual data are presented on the chart (usually by states) or by graphs or histograms. extual matter is ample for this type of atlas, and due credit is given for sources. It would be npossible to list the many types of data thus presented. The 1031 charts (taken from a number of ources) are arranged under 34 chapters in the major sections: 1) temperature, 2) wind, 3) sunshine,) humidity, 5) precipitation, 6) effects of climate or weather and 7) climatic regions and changes. ffects on agriculture, health, soils, lakes, streams and topography are covered in Sec. 6. Unusual eatures are charts of degree days, variability or expectancies of extremes, droughts, excessive rain- ll, week to week and month to month temperature changes; duration (in days per year) of warm eather (50° to 68°F), etc. (*Same item as* 6.5–2, May 1955, *MAB.*) *Subject Headings:* **1. Climatic tlases 2. Climate of the United States 3. United States.**—*M.R.*

11A–97 551.58:92:016

†*Voeĭkov, Aleksandr Ivanovich, 1842–1916, **Izbrannye sochineniia.** [Selected works.] Mos- ow, Akademiia Nauk, **1948–1957.** 4 vol. Contents: Vol. 1 (issued **1948,** 750 p.), **Klimaty zemnogo hara, v osobennosti Rossi,** (p. 161–677). p. 93–160, bibliog. of his works. Vol. 2 (issued **1949,** 25 p.), **Vliianie snegovoĭ poverkhnosti na klimat,** p. 9–14. **Snezhnyĭ pokrov, ego vliianie na ochvy, klimat i pogody i sposoby issledovaniia,** p. 15–157. **Atmosfernaia tsirkuliatsiia: raspredе- enie atmosfernogo davleniia, vetrov i osadkov po poverkhnosti zemnogo shara,** p. 159–221. Vol. 3 issued **1952,** 502 p.), **Genezis pogody i klimata,** p. 15–317. **Izmenenie klimaticheskikh usloviĭ v eologicheskom proshlom i sovremennoe oledenenie,** p. 319–436. **Vodnyĭ rezhim i klimat,** p. 437– 00. Vol. 4 (issued **1957,** 537 p.), **Zemel'nye uluchsheniia i sposoby vozdeĭstviia cheloveka na rirodu,** p. 7 234. **Meteorologiia i sel'skoe khoziaĭstvo,** p. 235–316. **Ispol'zovanie klimatologii v neditsine,** p. 317–357. **DLC** (G59.V6). Also his: **Klimaty zemnogo shara, v osobennosti Rossii.** [Climates of the earth, and especially of Russia.] St. Petersburg, **1884.** 640 p. 10 maps, 14 raphs, tables. **Klimaty zemnogo . . .** transl. into German with title **Die Klimate der Erde (nach lem Russischen).** Rev. and enl. ed. Jena, **1887.** 2 vol. (396+422 p.). 10 charts, 13 graphs, tables. Also his: **Vozdeĭstvie cheloveka na prirody.** [Influence of man on nature.] Moscow, Gosudarst- vennoe Izdatel' stvo Geograficheskoĭ Lit-y, **1949.** 254 p. 90 refs. **DLC** (QC989.R4V82). (*Same tem as* 5–102, May 1950.) Also his: **Izbrannye sochineniia: sel'skokhoziaĭstvennaia meteorologiia.** [Selected works: agricultural meteorology.] Ed. by I. M. Petunin and F. F. Davitaia. Leningrad, Gidrometeoizdat, **1957.** 259 p. port., figs., tables, foot-refs., bibliog. p. 253–254. **DLC** (S600.V63). (For review by G. T. Selianinov on Vol. 1 of Selected works, see 4.4–231. For abstract on Vol. 1, see 3.4 4. For review by Selianinov on the original **Klimaty zemnogo shara,** see 2–155.)—The four volumes of selected works of A. I. Voeĭkov (Woeikoff), plus the volume containing selected works in agricultural meteorology, and the 1949 edition of his works on influence of man on nature, constitute the most ambitious effort in reprinting the scientific writings of a meteorologist or climatologist ever undertaken. Of course, there was a rich supply of material to choose from, as can be seen in the bibliography of over 1700 of his works published between 1865 and 1916 (250 of which were in languages other than Russian) cited on p. 93–160 of Vol. 1. This volume also contains an extensive biography and chronology of his life and activities by G. D. Rikhter (p. 35–90), and a critical evalua- tion and description of Voeĭkov's climatological concepts, by A. A. Grigor'ev. The major part (p. 163–728) of the first volume is a reprint of the 2d (1884) edition and the supplementary material in the German edition (1887) of his pioneer and classical work the **Climates of the Earth and especially of Russia.** (This work was translated into English by Cleveland Abbe in the period from 1890–1900 with additions provided by the author to bring it up to date, but was never published owing to the American publisher welshing on his bargain with the excuse of a financial "panic" lowering the prospective sales and thus increasing the financial risk involved). Vol. 2 contains a short and a long article on snow cover and its influence on climate, published in 1872 and 1889 respectively, and an article originally published in German in 1874, on "atmospheric circulation, pressure, winds and precip. over the earth," translated into Russian for the first time in the present edition. The third volume contains numerous articles on climatology, hydrology, glaciology and physical geography, divided into 3 groups: 1) genesis of weather and climate, 2) climatic changes in the glacial periods and contemporary glaciation, and 3) the hydrological cycle and climate, arranged in chronological order (1871–1920). Vol. 4 gives faithful reproduction of over 30 articles on the influence of man on nature, agricultural meteorology and medical climatology published between 1890 and 1915. In all cases the figures, tables, maps, charts, bibliographies, etc. are carefully reproduced and edited, with annotations and foot-references to make the works more valuable in the light of recent knowl- edge. *Subject Headings:* **1. Collected works 2. Selected works of A. I. Voeĭkov 3. History of climatology 4. Climatology 5. Climates of the earth 6. Agricultural meteorology 7. Bibliography of A. I. Voeĭkov 8. Biography of A. I. Voeĭkov 9. Voeĭkov, A. I. 10. Climate of U.S.S.R. I. Gri- gor'ev, A. A. II. Rikhter, G. D. III. Petunin, I. M. IV. Davitaia, F. F.**—*M.R.*

11A–98 551.5(030.8

†Wadati, Kiyo-o (*ed.*), **Kisho no Jiten.** [A meteorological dictionary.] Tokyo, Tokyodo Bk Co., **1954.** 572 p. numerous figs. (incl. photos), tables, plates and charts, refs., p. 522–526. In Japanese. **DLC**—A very recent and standard meteorological encyclopedia in Japan. Forty-one famous meteorologists contributed to this book which covers the whole field of meteorology. WADATI, who is director of the Japanese Government Weather Service, intends to issue a revised edition periodically. More than 1000 items are covered. Good illustrations and handy charts are given. (*Same item as* 8.3–64, March 1957, *MAB.*) *Subject Headings:* **1. Meteorological glossaries 2. Japanese language glossaries.**—*H. Arakawa.*

11A–99 551.574.1:061.3

Conference on the Physics of Cloud and Precipitation Particles, Woods Hole Oceanographic Institution, Sept. 7–10, 1955, **Artificial stimulation of rain: Proceedings of the First Conference,** ed by H. Weickmann. . . . Sponsored by the Geophysics Research Directorate, Air Force Cambridge Research Center, Air Research and Development Command, and the Geophysics Branch, Office of Naval Research. N. Y., Symposium Publications Div., Pergamon Press, **1957.** 427 p. figs., tables, refs., eqs. throughout. Price: $15.00. (For listing of contents, *see* Pt. III, p. 508, April 1958, *MAB.* These articles abstracted separately.) **DLC** (QC921.5.U5). Review by F. H. Ludlam in *Royal Met. Soc., Quarterly Journal,* 84(359):84, Jan. **1958.**—This nicely bound and edited book contains about 50 papers on various aspects of cloud physics, presented at the Woods Hole Conference, which was attended by over 70 scientists from various countries working in this broad field. The papers are divided into 4 major groups: I. Aerosols; II. Cloud droplet and rain physics; III. Role of the freezing stage; and IV. Laboratory and field studies of crystal nucleation and growth. Not much on actual cloud seeding experiments is included. Among the authors whose papers are published herein are: C. E. JUNGE, V. J. SCHAEFER, V. NAKAYA, H. WEICKMANN, H. R. BYERS, R. BRAHAM, JOHN SIEVERS, L. J. BATTAN, B. VONNEGUT, DAVID ATLAS, PAULINE AUSTIN, E. J. WORKMAN, R. WEXLER, W. HITSCHFELD, FOURNIER D'ALBE and many others. (*Same item as* 9.4–3, April 1958, *MAB.*) *Subject Headings:* **1. Cloud physics. I. U. S. Air Force. Cambridge Research Center. Geophysics Research Directorate II. U. S. Office of Naval Research III. Artificial stimulation of rain IV. Smith, Waldo** (*ed.*) **V. Weickmann, Helmut** (*ed.*).—*M.R.*

11A–100 551.515.44

*World Meteorological Organization, **World distribution of thunderstorm days, Pt. 1, Tables.** Its [*Publication*] *OMM,* No. 21 (Technical Publication No. 6), **1953.** 204 p. **Pt. 2, Tables of marine data and world maps.** Its (*Publication*) *WMO/OMM,* No. 21 (Technical Publication No. 21), **1956.** 71 p. 18 maps (folded). Both almost entirely tables. T-p. and legends in English and French. **DWB** (M06 W927p), **DLC** (QC851.W6445)—Pt. 1 of this publication lists average number of thunderstorm days (for entire period of record as stated) for each month, season and for the year, for 4000 stations in 90 countries, listed by continents (WMO regions), by countries and geographically (by lat. and long. belts) in each country (with coordinates of each station given). The volume is intended as an extension or supplement to the monograph published by C. E. P. BROOKS in *Great Britain Meteorological Office. Geophysical Memoirs,* No. 24, 147–164, **1925** (*see* 4K–37, Nov. 1953, *MAB*) and is useful for researchers in sferics, etc. The data do not give any indication of the number of lightning strokes or thunderstorms, or their severity or the diurnal frequency, but merely the number of calendar days on which thunder was reported on a midnight basis. Kampala, Uganda, has 242 days/yr. Pt. 2 gives monthly, seasonal and annual charts of the world based on tables of thunderstorm days for 5° squares at sea, supplemented by land data in Pt. 1, plus tables of marine data from British and German sources. (*Same items as* 6.3–10 (Pt. 1) and 8.8–27 (Pt. 2) *MAB.*) *Subject Headings:* **1. Thunderstorm frequency data 2. Thunderstorm distribution. I. C. E. P. Brooks II. Swoboda, G. III. Lugeon, Jean.**—*M.R.*

11A–101 551.510.535:541.14:061.3

The threshold of space: the Proceedings of the Conference on Chemical Aeronomy, sponsored by the Geophysics Research Directorate, Air Force Cambridge Research Center, Air Research and Development Command, Cambridge, Mass., June 25–28, 1956. Coordinated by Wentworth Institute. Ed. by M. Zelikoff. N. Y., Pergamon Press, **1957.** 342 p. figs., photos, refs., eqs. **DLC** (QC879.U57 1956)—About 200 scientists from many countries participated in this conference held at Cambridge, Mass., on June 25–28, 1956. The 45 papers are presented under 4 main heads: I. Atmospheric photochemistry-Earth and Venus; II. Spectroscopy and photochemistry; III. Rocket probing of the upper atmosphere; and IV. Phenomena produced by hypersonic flight. Subjects concerning the airglow, ozone formation, water vapor photolysis, sodium emissions, and other aspects of photodissociation, recombination and chemical luminescense in the high atmosphere as well as basic theoretical and laboratory studies are of interest to meteorologists and aeronomists. (For listing of contents, *see* Pt. III, p. 646, May 1958, *MAB*; all articles abstracted separately.) (*Same*

Item as 9.5–5, May 1958, *MAB.*) *Subject Headings:* **1. Photochemistry of upper atmosphere 2. Rocket spectroscopy 3. Hypersonic flight effects 4. Chemical aeronomy conferences. I. Zelikoff, Murray** (*ed.*) **II. U. S. Air Force. Cambridge Research Center. Geophysics Research Directorate III. Wentworth Institute IV. Conference on Chemical Aeronomy, June 1956.**—*M.R.*

11A–102 551.5(98):016

†Arctic Institute of North America, **Arctic bibliography.** Prepared for and in cooperation with the Dept. of Defense under the Direction of the Arctic Institute of North America. Ed. by Marie Tremaine. Vol. 1–8, issued Wash., D. C., U. S. Govt. Print. Off., **1953–1959.** Vol. 1–3, issued **1953** (4478 p.). Vol. 4, issued **1954** (1591 p.). Vol. 5, issued **1955** (1268 p.). Vol. 6 and Vol. 7, both issued **1956** (1208 and 1071 p.). Vol. 8, issued **1959** (1281 p.). Vol. 8 brings the total of titles abstracted to 49,086. Price, Vol. 1–3, $12.75 per set. Others about $5.00 each, from Govt. Print. Off. **DLC** (Z6005.P7A7)—The first two volumes contained about 5000 references, each with a descriptive (sometimes informative) abstract of articles on climate, geography, biology, engineering, etc. of the Arctic regions of both continents and the adjacent oceans and seas. Vol. 3 contains thorough subject and place indexes with over 100,000 references and cross-references under 18,000 headings, by area under each subject as well as by subject under each area. A list of 1300 serials is appended. Each additional volume contains about 4–8000 abstracts of the same general type and format, with an index to each volume. Probably 20% of the material is of interest to meteorologists or climatologists, and is indexed under headings such as auroras, climatic changes, clouds, cyclones and anticyclones, evaporation, fog, frost, humidity, ionosphere, microclimate, oceanography, precipitation, snow, solar radiation, upper air winds and wind, as well as under the specific geographic area or place involved. (For previous abstracts on this title, *see* 4.11–1, 6A–13, 8.3–59, 8.9–60, *MAB.*) *Subject Headings:* **1. Arctic bibliographies 2. Subject bibliographies 3. Climatology bibliographies 4. Arctic. I. Tremaine, Marie** (*ed.*).—*M.R.*

11A–103 551.525.5:016

†U. S. Snow, Ice and Permafrost Research Establishment, **Bibliography on snow, ice and permafrost with abstracts,** Vol. 1, Sept. **1951.** Latest vol. issued, Vol. 14, Jan. **1960.** Annual (semi-annual, Vol. 3–11, Jan. 1953–Jan. 1957). Always issued as its *SIPRE Report,* No. 12. 1000 abstracts per vol. Vol. 14 abstracts items 17001–18000. Title varies: Vol. 1–7 with title **Annotated bibliography on snow, ice and permafrost. Cumulative Index,** Vol. 1–10, Sept. 1951–July 1956 (through item 14,000), issued Nov. **1956.** (For abstract on Vol. 1–7, *see* 6A–36; on Vol. 1–11, *see* 8G–211; on Vol. 12–13, *see* 11.1–81; on **Cumulative Indexes,** *see* 8.1–55, 8G–211, *MAB.*) **DWB, DLC**—Each volume contains 1000 informative abstracts of literature on engineering and scientific aspects of snow, ice and frozen ground, from every country and language. About $\frac{1}{5}$ of the material is of interest to meteorologists, dealing with such subjects as albedo, radiation balance, cloud seeding, snow, sleet, frozen rain, soil temperature, snow cover and glaciers. Theoretical articles are given high priority even though the bulk of the material is for engineers. Most of the material is found in the Library of Congress where the project is housed (in the Science & Technology Division). A large proportion of the articles are from German (10%) and Russian (35%) sources. Each volume from 3–14 contains an author and detailed subject index. *Subject Headings:* **1. Snow, ice and permafrost bibliographies 2. Bibliography on snow, ice and permafrost 3. Annotated bibliographies. I. Hughes, Thomas E.** (*ed.*).—*M.R.*

PART III. TRANSLATIONS, RECENT MONOGRAPHS, AND ANALYTICS FROM SERIALS AND COLLECTED WORKS

Note: Material listed in these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of *Meteorological Abstracts.*

A. TRANSLATIONS

Belinskiĭ, N. A.: **Utilization of certain characteristics of atmospheric processes for long range forecasting.** (Excerpts, transl. into English, p. 182–202, of original Russian **Ispol'zovanie nekotorykh osobennosteĭ atmosfernykh protsessov dlia dolgosrochnykh prognozov.** Issued Leningrad, Gidrometeoizdat, 1957. 203 p. 67 figs., 27 tables, 77 refs., eqs. Original available DLC (QC995.B39).) Transl. into English available DWB (M09.33 B431ex). 52 p. Photostat includes tables 26–27 and the 77 refs.)

Blinova, E. N.: **Hydrodynamical theory of pressure and temperature waves and of centres of atmosphere action.** (Transl. of original Russian in *Akademiia Nauk SSSR, Doklady,* 39(7), 1943). Transl. issued as *Canada. Meteorological Branch, Meteorological Translations,* No. 2:1–4, 1959. ref., eqs. Available DWB

Bogorov, V. G.: **In the center of the Soviet Arctic.** (Transl. of original Russian, **V tsentre Sovetskoĭ Arktiki,** in *Molodoĭ Kommunist,* 12(9):75–80, 1954). Transl. by Ane M. Petersen (ed. by David Krause) issued by American Meteorological Society under Contract AF 19(604)-1936, Jan. 1959. 10 p.

Fuks, N. A.: **The mechanics of aerosols.** (Transl. of original Russian, **Mekhanika aerozoleĭ,** issued Moscow, Akademiia Nauk SSSR, 1955. 351 p. figs., tables, refs., eqs. Original available DLC (QD549.F9).) Transl. into English by E. Lachowicz, issued as *U. S. Chemical Warfare Laboratories, CWL Special Publication* 4–12, 1958. 448 p. figs., etc. DWB (M74.1 F961meE)

B. RECENT MONOGRAPHS

Ahmad, Mahammad Shafi: **Precipitations, evapotranspiration et aridité en Pakistan Occidental** [Precipitation, evapotranspiration and aridity in West Pakistan]. *Rennes. Université. Faculté des Lettres & Sciences Humaines. Laboratoire de Climatologie, Travaux,* No. 1, 1958. 91 p. tables, refs., eqs. DWB (M(055) R414tr)

Bowen, E. G.: **Wales: a physical, historical, and regional geography.** London, Methuen, 1957. 528 p. tables, maps, diagrs. DLC (Ref.)

Gutenberg, Beno: **Physics of the earth's interior.** *International Geophysics Series,* ed. by J. Van Mieghem, Vol. 1, issued N. Y., Academic Press, Oct. 1959. 240 p. Price, $8.50

Gentilli, Joseph: **Geography of climate: the synoptic world pattern.** 2d rev. ed. Perth, Univ. of Western Australia Press, 1958. 172 p.

Jeffreys, Sir Harold: **The earth: its origin, history and physical constitution.** 4th ed. Cambridge, University Press, 1959. 420 p. plates, figs., tables, eqs., bibliog. DLC (QE501.J4 1959)

Koestler, Arthur: **The sleepwalkers: a history of man's changing vision of the universe.** London, Hutchinson, 1959. 624 p. figs., refs., bibliog. DLC (BL245.K63)

Newell, Homer Edward: **Window in the sky: the story of our upper atmosphere.** N. Y., McGraw-Hill, 1959. 116 p. DLC (QC879.N47)

Pfeffer, Richard L., *ed.*: **Dynamics of climate.** N. Y., Pergamon Press, 1959. Price, 35 sh; $6.50

Thiel, Erich: **Die Mongolei: Land, Volk und Wirtschaft der Mongolischen Volksrepublik.** [Mongolia: land, people and economy of Mongolia.] Munich, Isar Verlag, 1958. 495 p. maps, diagrs., illus., bibliog., index of geographical names. DLC (DS798.T5)

U. S. Weather Bureau: **Climatic guide for New York City, New York and nearby areas.** Its *Climatography of the U. S.,* No. 40-26, 1959. 61 p. figs., tables, map. DWB, DLC (Govt. Pub. R. R.)

ng, Chün-hêng: **Simple geography of China.** Peking, Foreign Languages Press, 1958. 256 p. numerous photos and maps. Index of place names. DLC (DS711.W27)
omans, P. A.: **The challenge of landscape: the development and practice of Keyline.** Sydney, Keyline Pub., Ltd., 1958. 271 p. figs., plates.
ner, F. E.: **The Pleistocene period.** London, Hutchinson, 1959. 447 p. 80 figs.

C. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

ademiia Nauk SSSR, Izvestiia, Ser. Geofiz., No. 7, July 1959

Tikhonov, A. N. and Skugarevskaia, O. A.: **Ob asimptoticheskom povedenii protsessa stanovleniia elektromagnitnogo polia v sloistykh sredakh,** [Asymptotic behavior of the process of the establishment of an electromagnetic field in a stratified medium], p. 937–945

Tikhonov, A. N. and Shakhsuvarov, D. N.: **Elektromagnitnoe pole dipolia v dal'neĭ zone,** [Electromagnetic dipole field in a distant zone], p. 946–955

Rykunov, L. N.: **Difragirovannye na zemnom iadre P-volny i zhestkost' iadra Zemli,** [P-waves diffracted in the earth's core and the rigidity of the earth's core], p. 956–964

Epinat'eva, A. M. and Mikhaĭlova, N. G.: **Opredelenie tipov mnogokratnykh otrazhennykh voln po ikh kinematicheskim i dinamicheskim kharakteristikam,** [Classification of multiple reflection waves according to their kinematic and dynamic characteristics], p. 965–980

Glivenko, E. V.: **Opredelenie izmeriaemoĭ velichiny po izbytochnym nabliudeniiam v zadachakh seĭsmologii,** [Determination of measured values by excess observations when solving seismological problems], p. 981–987

Kogan, R. M.: **Ob odnom sposobe vychisleniia moshchnosti vozdushnoĭ dozy γ-izlucheniia v odnorodnykh geologicheskikh sredakh,** [Method for calculating the intensity of the atmospheric dose of γ-radiation in homogeneous geological media], p. 988–994

Vorob'ev, V. A.: **O vozmozhnosti primeneniia ekranirovannykh detektorov pri radiometricheskikh poiskakh s samoleta,** [Possibility of using screened detectors in aerial radiometric prospecting], p. 995–1002

Batalin, A. M.: **Teplovoĭ balans dal'nevostochnykh moreĭ,** [Heat balance of seas of the Far East], p. 1003–1010

Litvinov, I. V.: **Metodika izmereniia raspredeleniia po velichine chastits snegopadov,** [Method of measuring the size distribution of snowflakes], p. 1011–1017

Sergieva, A. P.: **Ob elektricheskikh zariadakh oblachnykh kapel',** [Electrical charges of cloud drops], p. 1018–1025

Perepelkina, A. V.: **Ob opredelenii turbulentnogo potoka tepla,** [Determination of turbulent heat flow], p. 1026–1035

Kuz'mina, N. V.: **Ob ispol'zovanii obmennykh voln pri izuchenii stroeniia zemnoĭ kory v iugovostochnoĭ chasti Glavnogo Kavkazskogo khrebta,** [Using exchange waves in investigations of the earth's core structure in the southeastern part of the Main Caucasian ridge], p. 1036–1045

Radzhabov, M. M.: **O nekotorykh osobennostiakh poperechnykh godografov prelomlennykh voln,** [Certain characteristics of transverse hodographs of refracted waves], p. 1046–1051

Papalashvili, V. G.: **Godograf seĭsmicheskikh voln Kavkaza dlia zemletriaseniĭ s poverkhnostnoĭ glubinoĭ zaleganiia ochagov,** [Hodograph of seismic waves in the Caucasus for earthquakes with shallow centers], p. 1052–1054

Rokitianskiĭ, I. I.: **O prirode vyzvannoĭ poliarizatsii ionoprovodiashchikh porod,** [Nature of induced polarization of ion conducting rock], p. 1055–1060

Berdichevskiĭ, M. N. and Briunelli, B. E.: **Teoreticheskie predposylki magnito-telluricheskogo profilirovaniia,** [Theoretical basis for magnetic telluric prospecting], p. 1061–1069

Rotshteĭn, A. Ia. and Tsirel', V. S.: **Nekotorye itogi rabot s iadernym magnitometrom,** [Some results of work with a nuclear magnetometer], p. 1070–1072

Levin, L. M.: **Elektrostaticheskoe osazhdenie chastits aerozolia iz potoka na bol'shie tela,** [Electrostatic settling of aerosol particles from a current upon large bodies], p. 1073–1075

Rovinskiĭ, F. Ia.: **Novye metody registratsii vodnykh kapel',** [New methods of recording water drops], p. 1076–1078

Karol', I. L.: **O vliianii prizemnogo sloia atmosfery na rasprostranenie tiazheloĭ odnorodnoĭ primesi iz vysotnogo mgnovennogo tochechnogo istochnika,** [Effect of the atmospheric layer near the ground on the distribution of a homogeneous admixture from an instantaneous high-altitude point source], p. 1079–1084

Arkhangel'skaia, V. M.: **Soveshchanie, posviashchennoe itogam nauchno-issledovatel'skikh rabot Tsentral'noĭ seĭsmicheskoĭ stantsii "Pulkovo" i issledovaniĭ po poverkhnostnym volnam,** [Conference dedicated to the results of the scientific research work of the "Pulkovo" Central seismic station and the investigations on surface waves], p. 1085–1086

Gvozdev, A. A. and Chekin, B. S.: **V redaktsiiu zhurnala "Izvestiia AN SSSR, Seriia Geofizicheskaia,"** [To the editors of "Izvestiia AN SSSR, Seriia Geofizicheskaia"], p. 1087–1088

No. 8, Aug. 1959

Epinat'eva, A. M.: **O summarnykh mnogokratnykh otrazhennykh volnakh,** [Total multiple reflected waves], p. 1089–1102

Pod''iapol'skiĭ, G. S.: **Rasprostranenie uprugikh voln v sloistoĭ srede,** [Propagation of elastic waves in a stratified medium], p. 1103–1113

Nikitin, V. N.: **Opyt registratsii obmennykh prelomlennykh voln tipa $P_1S_2P_1$ s tsel'iu vychisleniia uprugikh postoiannykh diabazov, skrytykh pod nanosami,** [Experiment on the registration of refracted waves of the type $P_1S_2P_1$ for calculating elastic permanent diabase, hidden by drifts], p. 1114–1126

Shirokova, E. I.: **Nekotorye dannye o kharaktere izmeneniia skorosteĭ v verkhnikh sloiakh obolochki Zemli,** [Some data on the nature of the velocity change in the upper layers of the earth's crust], p. 1127–1137

Vvedenskaia, A. V. and Balakina, L. M.: **Dvoĭnoe luchepreломlenie v obolochke Zemli,** [Double refraction in the earth's crust], p. 1138–1146

Gzovskiĭ, M. V.; Krestnikov, V. N. and Reĭsner, G. I.: **Geologicheskie metody kolichestvennoĭ kharakteristiki srednego gradienta skorosti vertikal'nykh tektonicheskikh dvizheniĭ (izmeneniĭ naklona) zemnoĭ kory i nekotorye rezul'taty ikh primeneniia,** [Geological methods of quantitatively characterizing the mean velocity gradient of vertical tectonic movements (changes in slope) of the earth's crust and some results of their application], p. 1147–1156

Krasovskiĭ, V. I.; Shklovskiĭ, I. S.; Gal'perin, Iu. I. and Svetlitskiĭ, E. M.: **Obnaruzhenie v verkhneĭ atmosfere elektronov s energieĭ okolo 10 kev na tret'em sputnike,** [The discovery by the third Sputnik of electrons with an energy near 10 kev], p. 1157–1163

Pletnev, V. D.: **Proniknovenie bystrykh zariazhennykh chastits iz verkhneĭ atmosfery v ionosferu,** [Penetration of fast charged particles from the upper atmosphere into the ionosphere], p. 1164–1166

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★**Acta Geophysica Polonica,** [Warsaw].
★**Acta Meteorologica Sinica,** [Peking].
★**Akademiia Nauk SSSR, Izvestiia, Ser. Geogr.** and **Ser. Geofiz.,** [Moscow].
American Geophysical Union, Transactions, [Washington].
★**American Meteorological Society, Bulletin,** [Boston].
★**Angewandte Meteorologie,** [Potsdam].
Annales de Géophysique, Central National de la Recherche Scientifique, [Paris].
★**Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B,** [Vienna].
★**Australian Journal of Physics,** [Melbourne]
★**Beiträge zur Physik der Atmosphäre,** [Frankfurt a. Main].
★**Ciel et Terre,** Société Belge d'Astronomie, Météorologie et Physique du Globe, [Brussels].
★**Geofisica e Meteorologia,** Società Italiana di Geofisica, [Genoa].
Geofisica Pura e Applicata, Istituto Geofisico Italiano, [Milan].
★**Geophysical Magazine,** Japan Meteorological Agency, [Tokyo].
Hemel en Dampkring, [The Hague].
★**Időjárás,** Magyar Meteorológiai Társaság and Országos Meteorológiai Intézet, [Budapest].
★**Indian Journal of Meteorology and Geophysics,** [Delhi].
★**Journal de Mécanique et de Physique de l'Atmosphère,** Société Météorologique de France.
★**Journal of Atmospheric and Terrestrial Physics,** [London].
Journal of Geophysical Research, [Washington].
★**Journal of Meteorological Research,** [Tokyo].
★**Journal of Meteorology,** American Meteorological Society, [Boston].
★**The Marine Observer,** Air Ministry, Meteorological Office, London.
★**The Meteorological Magazine,** Air Ministry, Meteorological Office, London.
★**Meteorologické Zprávy** [Prague].
★**Meteorological Society of Japan, Journal,** [Tokyo].
★**La Météorologie,** Société Météorologique de France, [Paris].
★**Meteorologiia i Gidrologiia,** [Leningrad].
★**Meteorologische Rundschau,** [Berlin].
★**Monthly Weather Review,** U. S. Weather Bureau, Washington, D. C.
Polarforschung, Archiv für Polarforschung, [Kiel].
★**Przegląd Geofizyczny,** [Warsaw].
Revista de Geofísica, Instituto Nacional de Geofisica, [Madrid].
★**Rivista di Meteorologia Aeronautica,** Servizio Meteorologico, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
★**South Africa, Weather Bureau, Notos,** [Pretoria].
★**Tellus,** Svenska Geofysiska Föreningen, Stockholm.
Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Leningrad].
★**Weather,** Royal Meteorological Society, [London].
★**Weatherwise,** American Meteorological Society, [Boston].
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna].
★**WMO Bulletin,** World Meteorological Organization, [Geneva].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam.

★ Indicates those periodicals which are primarily meteorological.

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